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NATIONAL  
BRUCELLOSIS  
COMMITTEE

13  
• 1965  
PROCEEDINGS

56 ✓  
UNITED STATES DEPARTMENT OF AGRICULTURE

FOREWORD

The 1965 proceedings of the National Brucellosis Committee clearly defines the progress that can be made when all facets of the livestock producing, marketing, and slaughtering industry work together to solve a difficult problem--the eradication of brucellosis. This report will be of interest to all persons concerned with the losses inflicted by livestock diseases--Agricultural Extension Agents, veterinarians, Vocational Agricultural Teachers, and other agricultural leaders.

R. J. Anderson  
Deputy Administrator  
Agricultural Research Service  
U.S. Department of Agriculture

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Sponsored by Livestock Conservation, Inc.

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Issued November 1965

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## A NEW PROCEDURE FOR SCREENING COWS FOR BRUCELLOSIS AND TUBERCULOSIS



**A PANEL DISCUSSION:** The use of one livestock identification procedure--the backtag-- to screen cattle during the marketing-slaughtering process for two diseases--brucellosis and tuberculosis.

**PANEL MEMBERS WERE:** (Left to right) Archie Wilson, co-moderator, Montana Livestock Sanitary Board and cattle producer; William Skorich, Beef Division Superintendent, Swift & Company, St. Paul, Minn.; R. Platt, Plant Superintendent, Armour & Company, St. Paul, Minn.; Dr. C. C. Hamilton, Meat Inspection Division, U. S. Department of Agriculture, St. Paul, Minn.; R. B. McCreight, Division President of St. Paul Union Stockyards, St. Paul, Minn.; and Bob Laramore, co-moderator, American National Cattlemen's Association and cattle producer, Gillette, Wyoming.

Before we hear from the members of the panel, I would like to briefly discuss our pilot Market Cattle Testing program commenced in 1957 in Montana, the first in the range cattle area. Washington followed suite with the MCT backtag program. Since that time the MCT program has proven to be a real asset in eradicating brucellosis. With such a low down-the-road testing rate, we had reached the position in the range area that had we not developed something along this line, the program would have come to a standstill.

I would like to give you some figures concerning Montana. During 1964, Montana screened 5.6% of its total breeding cow population through the use of backtags. There were 76,828 backtagged cattle identified with the herds of origin and 5,861 identified by brand on direct shipment. Full time State-Federal employees applied 125,857 backtags. Most of this was done in fifteen Montana auction markets. An additional 922 tags were applied by ranchers on the ranch. Of the total animals backtagged, we got a 61.2% blood sample recovery. A rate of 60% would give us a real good screening process.

In all, 19 counties were recertified during the year. The eligibility of two of these were based on the MCT tests alone. And, in the 17 other counties, MCT was used to qualify some herds. As far as a range state such as Montana is concerned, MCT has been a real significant approach. And I think that it can be real satisfactory for use in every State in the Union.

The members of this panel represent two major slaughtering plants, one of the Nation's largest stockyards, the Meat Inspection Division of the U. S. Department of Agriculture and Mr. Laramore and I, cattle producers. I say we are all more or less shooting for the same goal -- disease free animals going to slaughter and a lower percentage of condemnations. The end result will be good, wholesome products reaching the American housewife and the consumer table. The advantages are great. The more meat that is consumed, the better off we all are.

Mr. Skorich: (Swift & Co., St. Paul, Minn.) It is pleasant and gratifying to be part of this occasion. We at Swift & Company have looked forward to this event with interest and enthusiasm. For this reason: The setup for the collection of blood samples at our plants in South St. Paul has turned out to be a fully successful workable program -- something we never had before. Possibly, the program is successful because you put us in on the planning.

How did this program come about? First there was a basic desire on the part of all concerned. Dr. D. F. Werring, Federal Veterinarian in Charge of animal disease eradication, and Dr. H. J. Osterholtz, inspector in charge of meat inspection, stimulated desire to get the job done. Dr. Vic Berry, with USDA's Meat Inspection Division, made diligent efforts to solve the problem. There was Dr. E. H. Gloss and his teammates in meat inspection--names too numerous to mention. We now have Dr. Joseph L. Blair as our local meat inspector supervisor. What does this add up to? Teamwork, cooperation, determination and a willingness to be open minded and work together to get the job done.

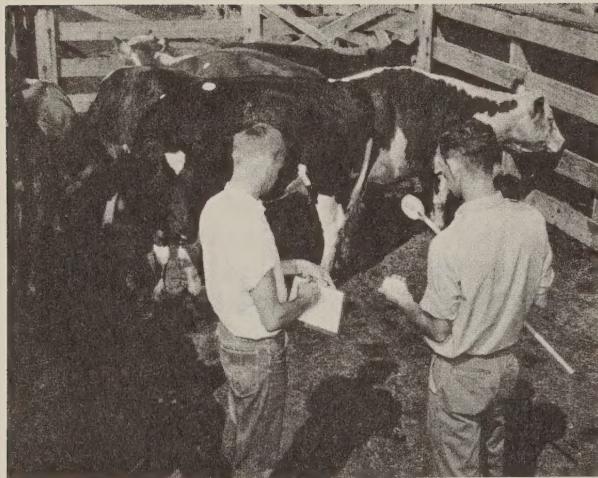
We would be the first to admit that when the mechanics of this new procedure were first discussed we were skeptical and were very unfavorable toward it. To be perfectly blunt, the method previously used to draw blood was crude, dirty, messy, and ineffective. Why crude? Did you ever try to collect blood samples in the sticking area? We added people to our units and still we were unable to do a satisfactory job. Ineffective, yes very ineffective. At no time were we ever able to recover from over ten to fifteen percent of the carcasses that were identified or backtagged.

We employ a lot of people. It is a large operation. Adding people to a job does not necessarily solve a problem. Today we have a modern, streamlined up-to-date method of collecting these samples. Why shouldn't the packers be enthusiastic? It hasn't added one cent of expense to our operation. That has proved something to all of us. When a job needs to be done, the best way is through cooperation. We certainly are very enthusiastic. That is the way we intend to continue.

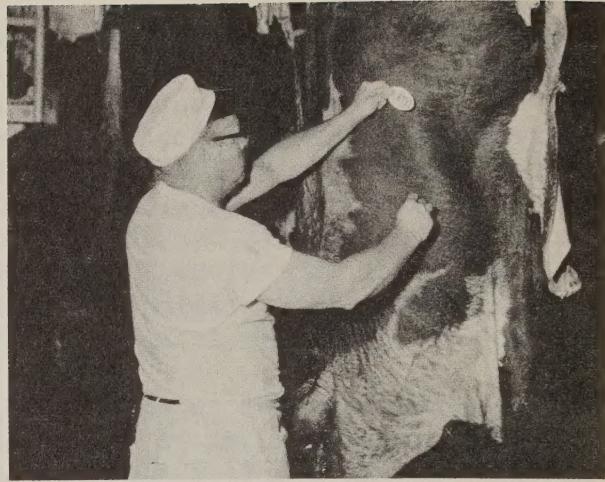
Here's why the system works ... the identification tag is taken off the back. Then this identification tag is placed in a plastic bag and is attached to the skinned-out portion of the belly. The reason for this is that it will not interfere with the balance of the skin removal operations. It remains there until it comes to the viscera table. At the viscera table the inspector after making his normal inspection, fills a blood tube from the heart and after stoppering the tube, places it in the same plastic bag. It then continues down the line until it reaches the final rail inspector. The carcasses are identified and there is no possible chance of slipping up.

The rail inspector placed it in a compartmented carton and later on during the day an employee of the Meat Inspection Division collected the cartons and sent them to the Federal laboratory at St. Paul. This is a simple solution. As I mentioned before, previously it was a truly crude operation. There is nothing messier than at the sticking area.

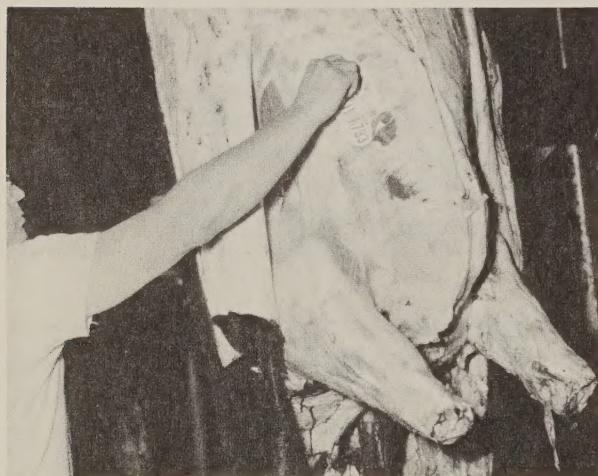
Where else can we collect the blood? The heart contains the same blood. The plastic bag came into being to maintain the identity of the cattle. Labor costs were not increased. I could go on and on, but, gentlemen, the point that I want to emphasize is that we're enthusiastic about the part we were able to play.



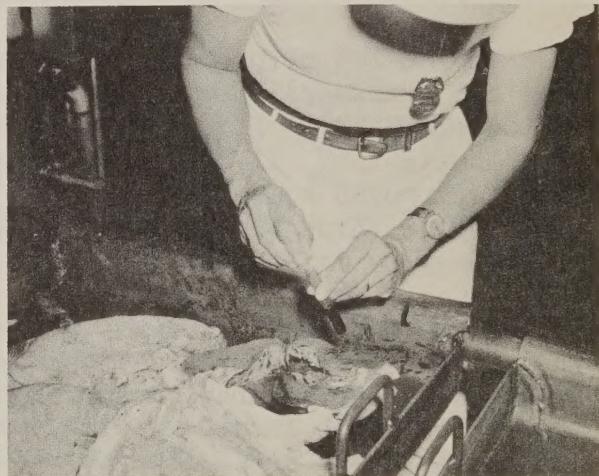
1. The backtag information, owner's name and address are recorded.



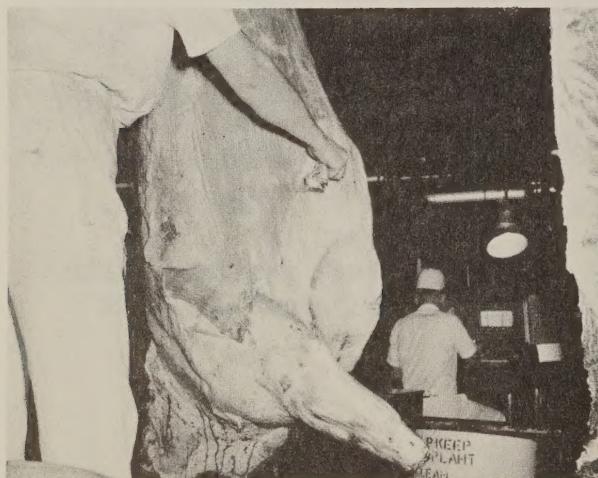
2. During skinning operation, tag is removed from hide and placed in bag.



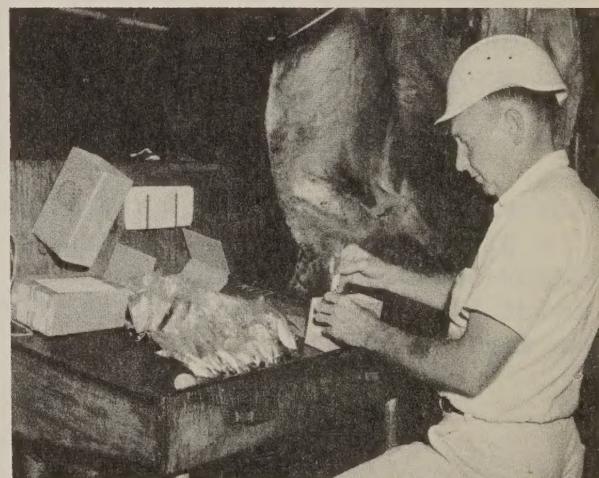
3. The plastic bag, containing backtag, is attached to the belly of carcass.



4. During routine viscera inspection, a blood sample is taken from heart.



5. Inspection completed, the bag, blood vial and tag are removed from carcass.



6. Blood sample is submitted to the laboratory for a brucellosis test.

Mr. McCreight: (St. Paul Union Stockyards) We share the feelings of Mr. Wilson when he spoke about the need for this program and the very fine job it is doing. It hasn't added a cent to the cost of marketing.

In this nation of ours we have long recognized that it takes the participation of all segments of the livestock industry to make effective programs aimed to improve the health of the livestock of this nation and thereby safeguard our wholesome meat supply.

For many years now both livestock producers and regulatory agencies -- State and Federal -- have labored to achieve the practical eradication of brucellosis and tuberculosis in cattle.

At long last a really effective, yet simple, program has been devised and put into operation. This is known as the market cattle testing program. This program is activated by the backtagging of cows 30 months of age and older. For the purposes of this program the backtags and necessary adhesive are furnished at no cost by the Animal Disease Eradication Division of the U. S. Department of Agriculture.

At the South St. Paul livestock market, tags are affixed by representatives of the Animal Disease Eradication Division and by the various market agencies. Every one of the 26 market agencies at this market is cooperating in this program, which was actively initiated at this market in May, 1964. For the market agencies this program involves affixing the tags furnished, and supplying the Animal Disease Eradication Division a weekly report on forms furnished for that purpose setting forth the tag number with the name and address of the owner and the date the tag was affixed.

Backtagging of cattle is now proceeding at the rate of better than 180,000 tags per year, or an average of 15,000 each month. There is no cost in this program to the livestock breeder even if the blood test or post mortem inspection reveals the suspicion of either brucellosis or tuberculosis. Then and then only a test of the remaining cattle of that owner is made on the owner's premises at the expense of the regulatory agencies. Of course if the test and post mortem report are negative, the owner and the Minnesota Livestock Sanitary Board also receive this information and the county and state then move closer to the goals of accreditation and certification.

Let's take a look at what this program means in Minnesota. This state has about 1.4 million head of dairy cattle 2 years of age and older, and approximately 450,000 beef animals in this same age classification. In establishing

and maintaining certified brucellosis areas, it is necessary that blood samples be collected and tested from at least 5% of the cattle population each year. This means that about 92,500 head of Minnesota cattle must be tested annually. At the present rate, more than 150,000 head of Minnesota cattle are being tagged annually at the South St. Paul market. If collections and tests are completed on only 65% of those backtagged, this program will expedite certification. At the present rate of backtagging, and testing it is anticipated that Minnesota will be certified tuberculosis free by 1970 and certified brucellosis free by 1967. The attainment of these goals will mark the completion of a long road of eradication.

Let me illustrate the ready acceptance of this program by two true stories.

Shortly after this program commenced, one owner received a report that one of his animals shipped to the market had been tested and found to be a reactor. He was incensed and complained to his market agency about this development and the fact that his cattle had been tested without his knowledge. We were fortunate that this complaint was promptly brought to the attention of Dr. William E. Bechdolt, the Supervisor in charge at the South St. Paul livestock market for the Animal Disease Eradication Division. Realizing the importance of prompt handling of the first complaint, Dr. Bechdolt--in company with Dr. D. F. Werring, Veterinarian in Charge for the Animal Disease Eradication Division in the State of Minnesota -- visited the farm of this shipper. The interview took place in his barn with a neighboring farmer present and listening. After Dr. Werring and Dr. Bechdolt had completed their explanation of this program and pointed out the value which it held for livestock men generally, they each remarked, "why hasn't something like this been done before?" They became enthusiastic supporters and were promptly converted to the merits of this backtagging program.

The second story concerns a shipper who had previously obtained results from a prior shipment of cattle. He came to the market one day and, before unloading his livestock, inquired at the unloading dock of our counter if he knew whether or not a certain firm was participating in this program. The program was still so new that our man wasn't able to inform the shipper with certainty. He asked if he could leave his cattle in the truck at the dock while he visited the alley of the commission firm to make sure whether or not they were participating in this program. When he returned several minutes later he informed our man that the firm in question was cooperating. Curiously our employee questioned the shipper and asked him what he could have done if he had learned that the firm was not cooperating. His answer was simple and direct--that he would have consigned his cattle to a firm that was participating.

Frankly, this program to me represents one of the greatest practical steps forward in the eradication of both bovine brucellosis and tuberculosis. This program removes from the livestock owner the inconvenience and cost necessitated by the program of periodic area testing. For the state regulatory agency it pinpoints with exactness the area of disease and thereby the opportunity to effect prompt eradication. For the public it is a tremendous step forward in the assurance of a healthy meat supply.

At the same time, the activity of backtagging at the market place has neither interferred with or disrupted the normal flow of market operations at our market at South St. Paul. This program could well be instituted and maintained in effect at practically any livestock market in my opinion. Sure, there will be some problems but none which cannot be easily solved with a little cooperation on the part of all concerned. After all, the benefits far outweigh the minor inconvenience involved.

We at the public market at South St. Paul are proud to have had a hand in this beneficial program, believing as we do that it is in the best interests of the livestock owner and that it will promote the economic well being of the livestock industry.

Mr. Platt: (Armour & Company) I think Mr. Skorich did a real good job defining the program as it affected the packers. I am just going to enlarge on it a little bit. We in the packing industry did take a very dim view of any new programs. Nine times out of ten it means adding people to our pay roll.

In our particular instance and I think Swift had the same experience, the 3-part tag meant adding two people. For every man you put on the payroll on the kill floor, it means \$5.00 more an hour, plus the fringes. At the rate we kill, 2 1/2 cattle a minute, we are adding 3¢ labor cost per head for every person we add to the pay roll. So it is a pretty big thing when we talk about adding people.

And the 3-part tag didn't work. When we were presented plans for the bag system we wanted to know: what is it going to cost in manpower? How many cattle are we going to lose? The first day we started there were no chain stops, no interruptions, no additional people needed. I am sure we will be a little more enthusiastic in our initial view of future programs.

Dr. Hamilton: (Meat Inspection Division) The Market Cattle Testing Program in Minnesota has been reborn. The program here has gained a new life. This was made possible because of the close cooperation of all parties involved.

Through the efforts of the Animal Disease Eradication Division with the close cooperation of the Stockyard Company the number of cattle backtagged locally has been greatly increased. We have had the whole-hearted co-operation of the packers in the metropolitan area. Also, wherever we went over the State, we ran into no problem.

The Meat Inspection Division with the cooperation of the Meat Packing Industry has developed a systematic method of blood collection. The result has been 126,241 blood samples collected and tested for Brucellosis in Minnesota during the 12-month period ending January 31, 1965. Of these nearly 70 percent were collected during the last half of this period.

Prior to 1964 the collection of blood samples on the killing floor was in cases difficult. We were trying to make the collection at the time the animal was bled. This particular location is congested, the floor slippery and to make collections here was often hazardous. Also, to try to collect samples in large numbers at this time would probably have retarded the rate of slaughter.

Meat Inspection Division employees in South St. Paul by using a small plastic bag have been able to devise a method of maintaining identification and collecting blood samples whereby large numbers can be handled with the least interference to Meat Inspection activities and we believe presenting no problems concerning the usual flow of normal dressing procedures.

This new procedure not only fulfilled the basic requirement of blood collection but has made it possible to maintain positive identification of the animal until such time as it is passed for food or retained for condemnation or other disposition. In other words an animal carrying a backtag which shows lesions of tuberculosis, malignant lymphoma, cysticerosis or any other abnormality can easily be traced back to the individual who consigned her to slaughter.

Basically this improved method of identification and blood collection is employed in the following manner. The backtag remains on the hide until the ventral surface of the animal has been skinned, at which time it is removed, placed in a small polyethylene bag and attached with a fastner to the belly of the carcass. Then during routine viscera inspection which, in part involves opening of the heart, the vial of blood is collected. After closing the vial

of blood is placed in the bag with the backtag, which is still attached to the carcass. After rail inspection has been completed the bag containing the backtag and blood are removed, providing no abnormalities are encountered. If abnormalities are present the retained carcass would go to the final room for further examination by a veterinarian. In this case the bag, tag, and blood sample remain on the carcass. Consequently as previously stated animal identity is maintained until the carcass has passed inspection or has been otherwise disposed of.

Even though this procedure was developed at a large slaughter operation using the modern rail type of dressing procedure we have been able to apply it to all plants in this area. Some variations were necessary in some plants, but in all locations we do maintain identity throughout the complete operation.

At some of the plants which process large numbers of these animals it has been necessary to employ additional inspectors, while at others it has been possible to make these collections with the present force.

Discussion:

Question: Is there enough blood in the heart each time a sample is collected?

Answer: Dr. Hamilton: This has not been a problem. Keep in mind, the brachial vein is a source of blood in case it is needed.

Question: How far has this procedure been extended to other states in packing plants that are collecting samples?

Answer: Dr. Hamilton: Sorry, I can't answer that question. I know there are other states that have exhibited interest. Representatives from Michigan were here.

Dr. Werring: Wisconsin is using it widely. It is used in Iowa. They had representatives here. Illinois has adopted it in at least one of their concentration points. North Dakota, Michigan, and others are interested in the procedure.

Dr. Mingle: I think Dr. Werring has answered the question. There is wide interest in this program.

Comments:

Mr. Platt, Armour & Co.; Should any of you have the time I would like to extend an invitation to visit our plant and see the mechanics of MCT procedure. We would be more than happy to show you the operation.

Dr. Anderson, Deputy Administrator, Regulatory and Control, USDA, ARS: If I hadn't been here, I wouldn't have believed it. We can't test the cows down-the-road any longer. The only way it would be possible for us to continue the brucellosis programs is to use the MCT throughout the country. I thank members of the panels, Dr. Bechdolt and others responsible for really doing a good job. Thanks for getting this thing done. There is no resemblance to what used to be and what is now. It is new to me -- this kind of cooperation -- we haven't had it in the past.

Question:

How long has this been in operation?

Answer:

Dr. Hamilton: We started the first of February or the last of January. The program started off real slow. In the following months there were a tremendous number of samples and a problem in getting these animals tested. There had to be a change in collection procedures before we could go along with it.

Dr. Werring: We did start in February. We applied something under 3,000 tags during that first month. We gradually increased until 20,000 in October. That was our top month. When we extend our tagging to auction markets, the rate will probably reach 250,000 per year, and with our recovery rate of 75%, that should give us 10% of our breeding population. This is not an ADE program alone. It is strictly one of cooperation.

Question:

What percentage of cattle coming through St. Paul here are from out of state?

Answer:

Dr. Werring: 80% from within the state.

Mr. McCreight: About 20% from out of state.

Dr. Werring: North and South Dakota and Wisconsin all ship tagged animals, but we collect the most from Montana. Collections from Montana during fall months run about 5,000 per month. We run 10-12,000 out of state, total per month. We are applying tags only to our own and Wisconsin cattle. Five thousand and eighty-six tags were applied in one week. During that top month of October, over 2,000 were put on Wisconsin animals.

Mr. Wilson      Do you share our enthusiasm? Do you feel the eradication asked the panel: of brucellosis and tuberculosis would be advantageous to your industry as it is to the livestock industry?

Answer:            Mr. Platt: We don't make a dime out of condemned cattle. There should be an acceptance of this procedure clear across the country if this information is funneled out to everyone.

# EXPERIENCES OF AN EPIDEMIOLOGIST WORKING WITH PROBLEM HERDS

by

Paul L. Nicoletti\*

It is an axiom that success often creates or, at least uncovers problems. This has been true for animal disease eradication programs. Yet, the progress in brucellosis eradication has not been greatly impeded by difficult situations. Careful evaluations and scientific investigations are providing solutions to difficult problems.

One of the criteria for a successful disease eradication program is a diagnostic method with a high degree of accuracy applicable to mass populations. The dramatic reduction in the incidence of brucellosis nationally is testimony to the effectiveness of standard agglutination tests and procedures. Nevertheless, the aberrant behavior of a small number of animals has resulted in problem herds. Since our goal is eradication of brucellosis, these animals and herds gain increasing importance as the program progresses.

The term, problem herd, most often implies one in which there is persistent infection in spite of accepted methods to eliminate it. However, other types of difficulties deserve and receive our attention. There may be persistent ring test positive herds in which no reactors are found, suspicious animals in herds not considered infected, or herds with recent infection. Each situation demands an epizootiologic study to determine the extent of the problem and methods to solve it.

In 1962, after completing two years of graduate training at the University of Wisconsin, I was assigned to New York to conduct a problem herd program. Since that time, we have worked with various types of problem herds in New York and Vermont. Two charts show the progress made in each State up to that time and since our program began. Studies have been conducted on the following number and types of herds:

	<u>N. Y.</u>	<u>Vt.</u>
Herds with Persistent Infection	90	40
"False Positive" Ring Test Herds	30	15
Herds with Suspects Only	<u>130</u>	<u>45</u>
	250	100

Nearly all of these epizootiologic investigations have been correlated with extensive bacteriologic and serologic studies in order to evaluate a large number of serologic procedures. Many interesting facts have been learned and I should like to elaborate on some of them.

\*Dr. Nicoletti is a brucellosis epidemiologist with the Animal Disease Eradication Division, Agricultural Research Service, USDA, Albany, N.Y.

<u>Date Tested</u>	<u>No. of Animals</u>	<u>Standard Reactor</u>	<u>Test Results Suspicious</u>	<u>Supplemental Test Results Positive</u>
6/10/63	583	41	23	
6/24/63	47	4	7	
6/27/63	35	0	2	
7/16/63	613	7	19	
Began problem herd work:				
8/19/63	579	3	31	9
10/21/63	559	1	4	5
1/7/64	609	1	3	3
3/3/64	573	2	3	8
3/31/64	719	2	2	8
5/5/64	532	6	4	1
6/16/64	727	2	7	4
9/15/64	1172	2	3	7
11/3/64	1164	1	0	2
1/4/65	1136	0	12	2
2/2/65	1007	0	1	1
<b>TOTAL</b>		<b>72</b>	<b>110</b>	<b>50</b>

In addition to the reactors disclosed on the standard blood test, approximately 30 animals were sold on the basis of the supplemental test results. Brucella was isolated from many of these animals. The spread of brucellosis within this herd has been controlled through the removal of animals reacting on both the standard tests and the supplemental tests and we are optimistic that the disease has been eliminated. However, before this herd is released from quarantine, one more herd test will be performed to substantiate this opinion.

All of the intricate relationships which may be possible in a disease condition, such as brucellosis, are not completely understood. Therefore, we must constantly be alert for any unusual reactions or conditions. While we need to know much more about the host-parasite relationship, especially factors influencing susceptibility, the unanswered questions have not kept us from eliminating infection from the most difficult problem herd. A continuing program for research on the fundamental factors influencing the pathogenesis of this disease and its early detection is vital.

In summary, the routine procedures have been adequate when the incidence of brucellosis was high. These procedures have permitted the eradication program to make great progress in reducing the level of infection. However, it is estimated that approximately 5% of the infected herds have special problems which require additional procedures to eliminate the disease rapidly. The use of these procedures has been extremely beneficial in all States which have employed them wisely. The goal is eradication and we can settle for nothing less.

This goal will be achieved if we continue to use the standard test in areas of high incidence of the disease; expand the use of surveillance tests; and apply effective problem herd programs. After many years of working with this disease, I am convinced that brucellosis can be eradicated if we use the procedures we now have and if we are willing to adjust the program, when necessary, to meet changing conditions.

One hypothesis, now clearly proven, is that problem herds are often the result of inapparent carriers or "Typhoid Mary's". Approximately 40% of these culturally proven infected animals were not reactors on standard tests at the time the bacterial isolations were made. These animals are being detected by a battery of supplemental serologic procedures including acidified plate antigen, heat-inactivation, rivanol, mercaptoethanol, and complement-fixation tests on blood serum and individual ring and whey tests on milk. The complement-fixation test has been the standard procedure for diagnosing Brucella infections in cattle in many European countries and has proven to be a very valuable supplemental test in our program.

With respect to the use of supplemental tests, two points must be emphasized:

- a) Each test has limitations and should be performed, and most importantly, evaluated by qualified personnel; and
- b) all studies should be correlated with bacteriologic studies and herd histories.

Some of the most interesting data in our studies of problem herds relate to the number of vaccinates which are proven to be infected with field strains. Approximately 83% of the animals studied bacteriologically have been vaccinates and 82% (111) of the isolates have been from vaccinated animals. This indicates that infection may occur in vaccinates and be masked by their failure to attain reactor titers. Also, we have found many infected animals whose age was below the recommended minimal testing age of 30 months. These facts, correlated with the difficulty of the standard tests to differentiate between residual vaccinal reactions and those due to field infection, make two recommendations apparent:

- a) Vaccination should be de-emphasized in areas of low incidence; and
- b) animals should be vaccinated and tested at younger ages.

One of the functions of an epidemiologist is to examine possible reservoirs of disease. A serologic survey is being conducted on serum samples from swine collected at slaughter establishments in the State of New York. The collection and identification of samples are obtained through the cooperation of the State Meat Inspection personnel. Since the beginning of this project, over 3,600 serum samples have been collected and tested.

The test results indicate that the incidence of swine brucellosis in New York is apparently quite low. This was borne out by tracing the animals with a positive reaction and conducting tests on the herds of origin. Our epizootiologic studies have indicated that swine are not a source of infection for cattle herds.

Two surveys on the deer population in New York have been conducted and no evidence of brucellosis has been found in over 800 blood samples tested. These studies correlate very closely with surveys conducted in other States. It is generally agreed that Brucella infection among deer is not a problem and that the presence of deer near farming areas will not impede the eradication of brucellosis from domestic animals. Similarly, we have examined a limited number of rodents and have failed to find any evidence of infection.

Although our survey results agree with those conducted by others on the low incidence of brucellosis in wildlife, this does not eliminate the possibility of an interrelationship between brucellosis in domestic animal and wildlife in isolated instances. We must recognize this possibility even though it has not affected our efforts to eradicate the disease from infected herds to date.

I would like to comment briefly on our efforts to eradicate brucellosis from two large problem herds. The first herd is a large commercial beef herd in New York in which brucellosis was evident prior to 1959. At that time, it was apparently released from quarantine too quickly following a single test without reactors. This herd, under New York regulations, was required to be tested again in 1962 on a routine test of beef herds.

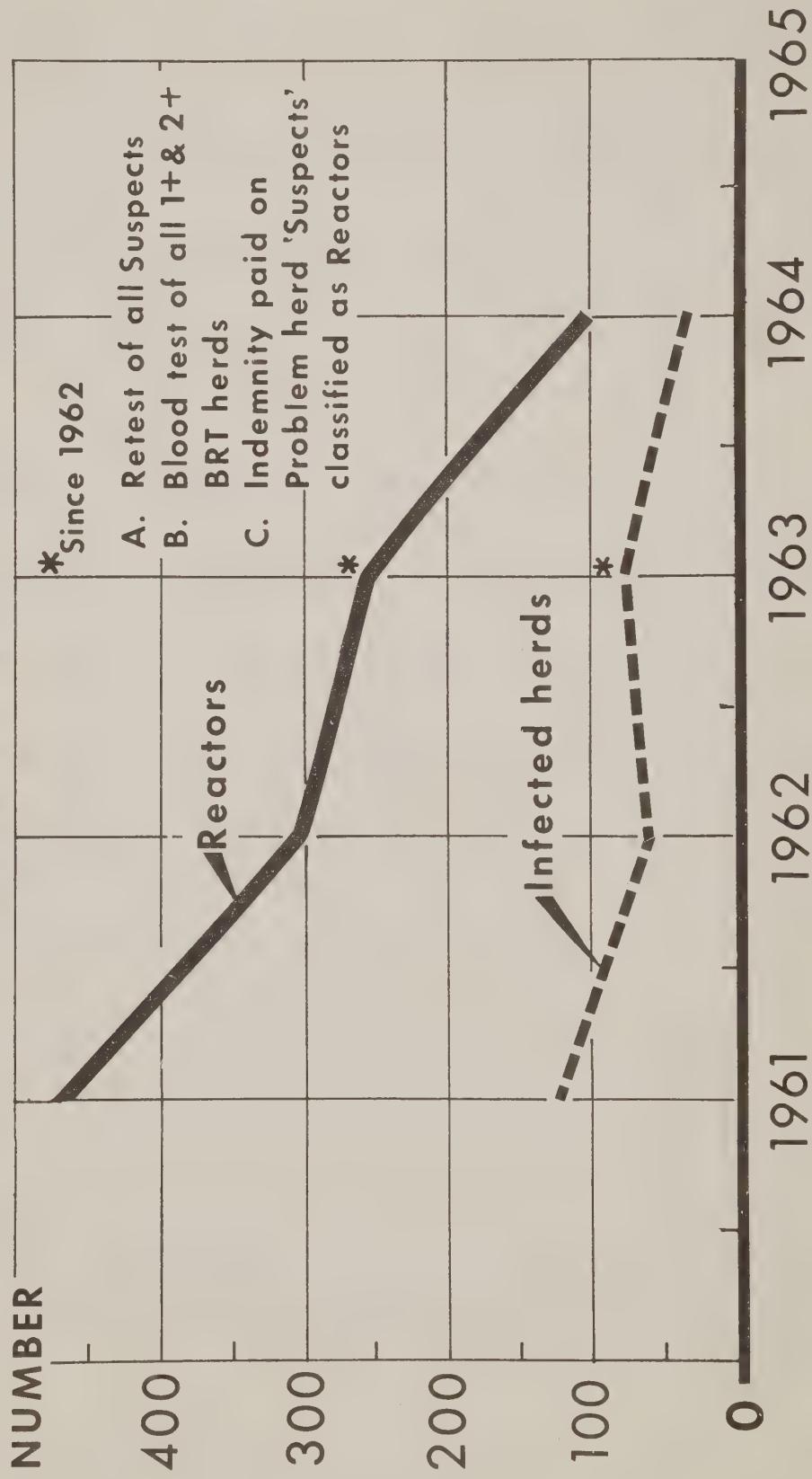
During 1961 and 1962, numerous abortions occurred in the herd, but were ignored by the herd owner and no professional veterinary help was solicited. In 1963, a routine area test of 1,921 animals in this herd revealed 434 or 22% reactors and 267 suspects. This herd has been retested four times and, on the last test, 2,219 animals were tested, of which only two reacted and 42 were suspicious.

During the testing period, 537 reactors have been condemned and removed from this herd and the owner elected to sell most of the suspects following each test. In addition to the reactors, many other animals were removed from the herd on the basis of the supplemental test reactions. We are confident that satisfactory progress is being made toward the elimination of the brucellosis from this herd. We anticipate that the herd will soon be free of this disease.

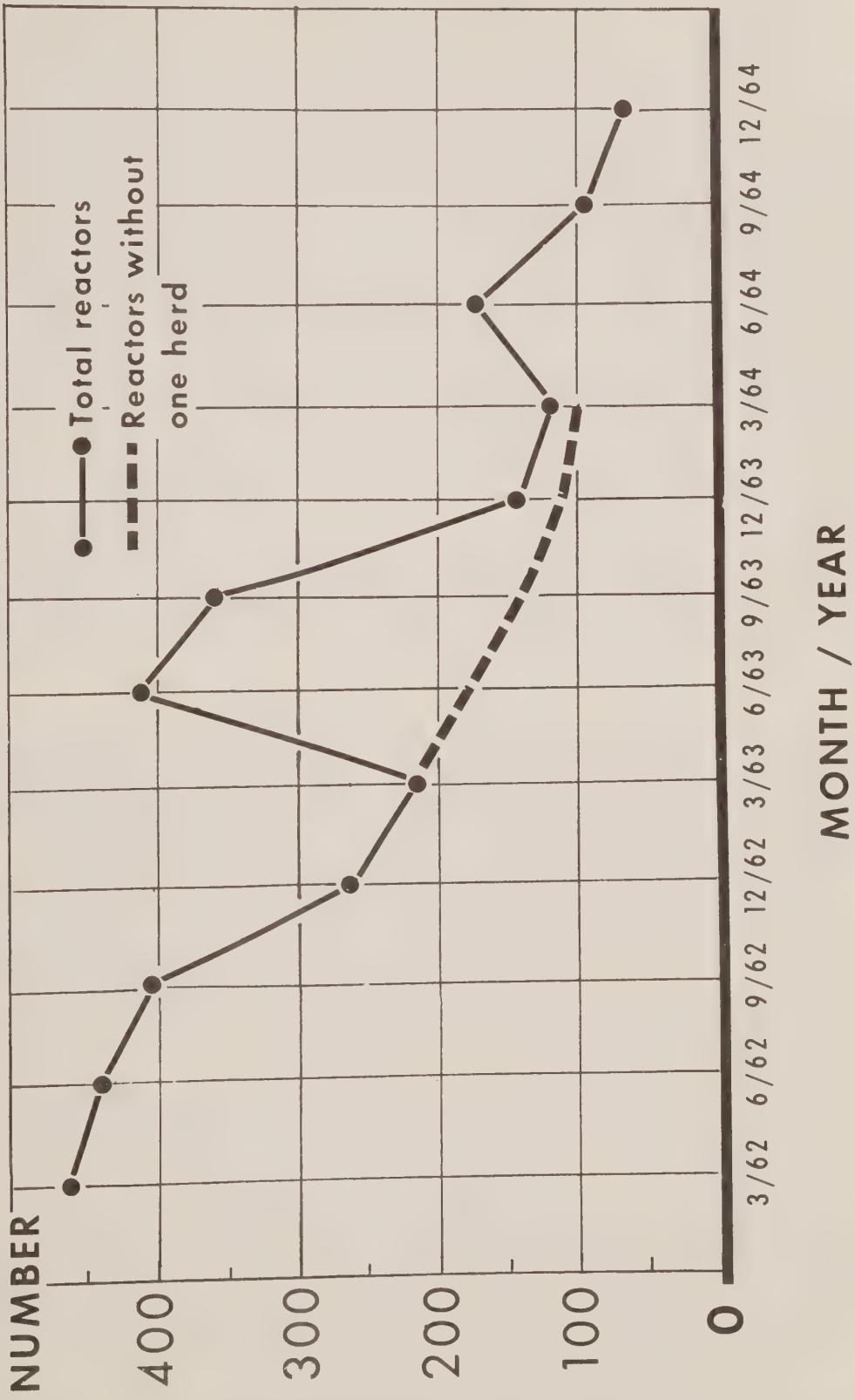
The second example involves a large dairy herd in Vermont which utilizes a loose housing arrangement dividing the herd into sub-units. This herd, established in 1961, was negative to the brucellosis milk ring test until May of 1963. Immediately preceding the first suspicious ring test reaction in May, the owner of this herd purchased two vaccinated animals which later aborted.

Blood testing of the cattle began in June 1963 and, during the first month, 45 reactors and 30 suspects were detected. By August, this herd was enrolled in the problem herd program and has been under surveillance since that time. The test results can be summarized as follows:

# PROGRESS IN BRUCELLOSIS ERADICATION, VERMONT



# BRUCELLOSIS REACTORS, NEW YORK 1962-1964



U. S. DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

THE VACCINATION OF CATTLE WITH BRUCELLA ABORTUS, STRAIN 19

A Preliminary Report  
by  
E. A. Schilf\*

This report is a partial fulfillment of a request by the Brucellosis Committee, USLSA, for the Animal Disease Eradication Division to obtain data relative to the possible effect of the vaccination program on the brucellosis eradication effort.

Although insufficient data has been obtained to permit the formation of any firm conclusions, the present data indicate that the field observations may be supported. The information contained in this report is based upon brucellosis problem herd work in 21 States performed during 1964. The data contained in this report deals only with animals in problem herds on which Brucella cultures were attempted.

Laboratory procedures in the various States vary slightly. For example, one State may collect lymph nodes from 12 sites while another State may examine only one. Therefore, this variation along with others such as differences in mediums, antibiotic levels, and use of laboratory animals will influence the efficiency in recovering Brucella. Consequently, these reasons and the fact that an insufficient number of animals have been reported make this a preliminary report.

In Table I a general summary of all of the data reported is shown. Out of a total of 546 herds which have had at least one animal subjected to bacteriological examination for Brucella, 156 were proven to harbor this organism. While Brucella has not been isolated from the remaining 390 herds, an average of only slightly over 2 animals per herd have been selected for bacteriologic examination. Furthermore, the majority of these animals have been subjected to an attempt to recover Brucella on only one occasion. The intermittent shedding of Brucellae in the milk and the variability in localization within the body undoubtedly has influenced the failure to isolate Brucella from among these herds. Since Brucella was not recovered from animals in these herds, they will not be included in this report except in Tables I and II.

The other information furnished in Table I provides the total number of culture attempts made in each group as well as the number of animals selected for bacteriologic study and their vaccination status.

Table II classifies the herds from which Brucella was isolated and the herds from which Brucella was not isolated by the herd history at the time of enrollment in the problem herd program. On this basis, it is clear that many of the herds, particularly in first three groups, are infected and should yield Brucella provided sufficient culture attempts are conducted

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in the future and the infection has not been eliminated through the removal and slaughter of previous reactors. Although the data in this table under Column 4 does not prove that brucellosis is an important factor in the so-called "non-specific" BRT herds, previous information from several States has indicated that a non-reacting Brucella-infected carrier cow(s) is frequently the source of the ring test reaction.

In the 156 herds from which Brucella was isolated from one or more animals, positive culture results were obtained on 322 out of 600 attempts involving 579 cattle. Some of the animals were positive on culture on two occasions thus reducing the total number of positive cattle from 322 to 306 (Table III). Similarly, the 278 attempts which failed to yield Brucella were made on 273 animals.

Only the data on animals from proven infected herds from which Brucella was isolated from one or more animals are included in Table III. These data were grouped by sero-agglutination test titers at the time of the first isolation of Brucella or by the highest titer in the case of culture negative cattle when two isolation attempts had been made.

A bar graph (Figure 1) based upon the data in Table III illustrates the percentage of isolation among the vaccinees and non-vaccinees, which includes the animals with an unknown vaccination status, using the standard interpretations and again using the same interpretations of vaccinees and non-vaccinees.

Although only a relatively few animals are represented by this graph, the large percentage of suspicious vaccinated animals which were positive on culture under the present interpretation of the sero-agglutination test supports the field observations of brucellosis epidemiologists and specialists working with problem herds on the importance of detecting infected animals among the low titered vaccinees. The marked decrease in the percentage of isolations from vaccinees in the Incomplete at 1:50 to Incomplete at 1:100 dilution range favorably compares with the percentage of isolation in a similar range among the non-vaccinees.

In spite of the limited number of culture studies which have been reported it is interesting to note that 13 of the isolations have been indistinguishable from Strain 19. All of these isolations were obtained from vaccinated female cattle. The age of vaccination varied from 7 months of age to 20 months of age in eleven of these cases. The age of vaccination could not be determined for two animals. Only four of the eleven animals were vaccinated within the recommended ages and while most of the animals were first calf heifers at the time of isolation one cow was seven years old. Other reports of recovery of a similar organism which is indistinguishable from Strain 19 have been made but were not available for this report.

Brucella was isolated from 15 vaccinated animals which were less than 30 months of age at the time of recovery including five animals yielding a Strain 19-like organism.

The majority of cattle in this group were 24 months of age at the time the isolation was made, but the ages ranged from 22 to 28 months.

In conclusion, the preliminary results of this survey seems to support field observations that vaccination practices using the present interpretation is masking considerable infection in the suspect titer range. Furthermore, several Strain 19-like cultures have been recovered from vaccinated animals. The reporting of culture attempts from all States engaged in problem herd studies will be continued in an effort to amass sufficient data for reaching valid conclusions on the possible complicating effect of vaccination on the brucellosis eradication program. This information will apply primarily to those areas which are free or nearly free of brucellosis since only modified certified States are actively engaged in a problem herd program.

TABLE I

TOTAL NUMBER OF BRUCELLA CULTURE ATTEMPTS REPORTED

Culture Results	Total No. of Herds	Total No. of Attempts	Total No. of Animals	Number of Non-vaccinates Cultured	Number of Vaccinates Cultured	Number of Animals of Unknown Vacc. Status Cultured
Brucella Isolated	156	600	579	252	252	75
Brucella Not Isolated	390	867	803	154	564	85
Total	546	1,467	1,382	406	816	160

TABLE II.

Brucella Culture Attempts in 546 Herds  
Classified According to Herd Problem

Culture Results	Persistent Infection	1	2	3	4	5	6	7	8
		Sporadic Infection	Newly Infected	BRT Susp. without Blood Reactor	MCT Susp. without Blood Reactor	Suspects on Herd Test Possibly Due To Cross Reactions	Suspects On Herd Tests	Unknown	
(156)						0	0		
Brucella Isolated	43	25	81		5	0			2
(390)									
Brucella Not Isol.	40	46	77	84	2	43	81		17
(546)	TOTAL	83	71	158	89	2	43	81	19

TABLE III

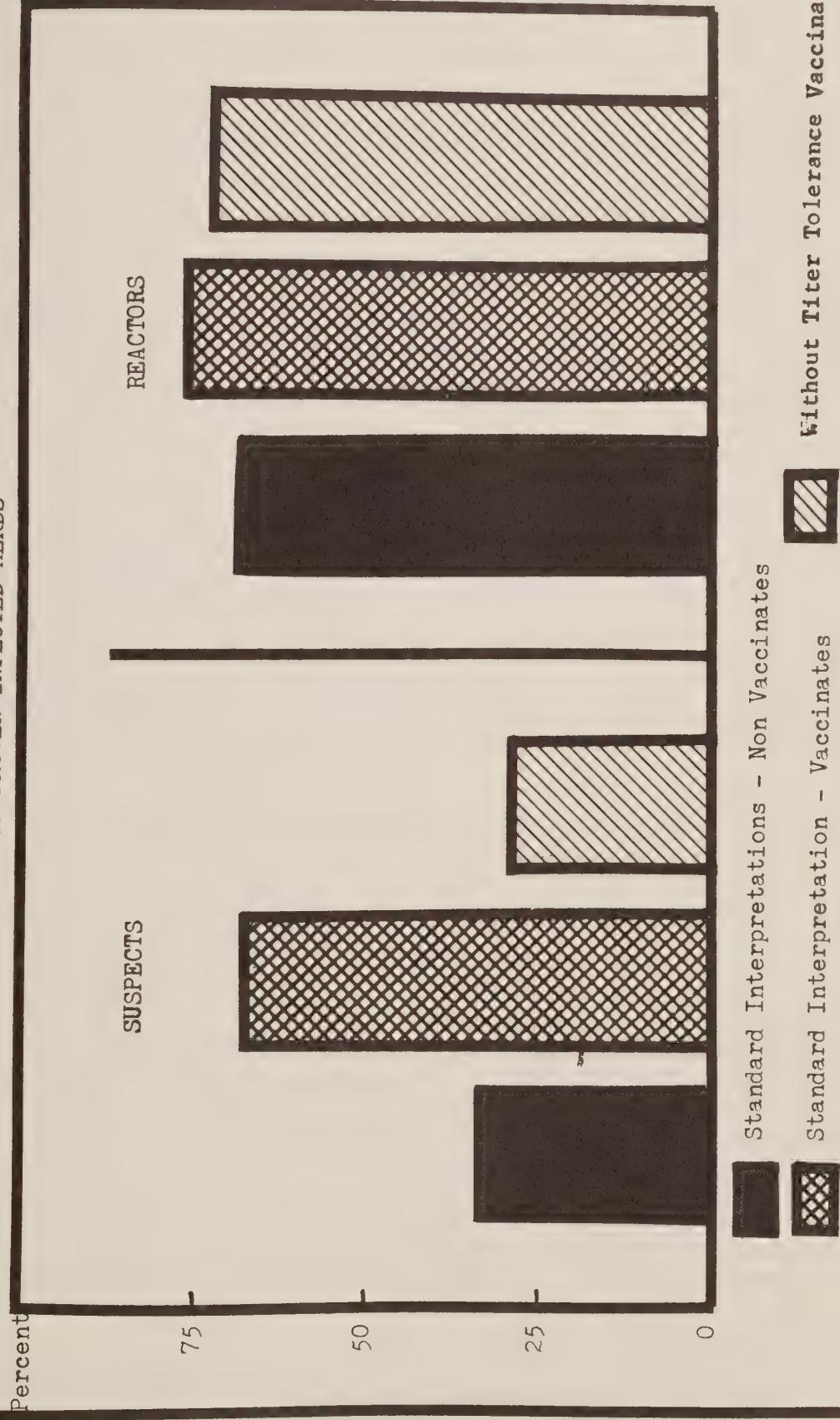
RESULTS OF SERO-AGGLUTINATION TESTS AND CULTURE ATTEMPTS  
ON ANIMALS FROM PROVEN BRUCELLA INFECTED HERDS

	-----Culture Positive-----		-----Culture Negative-----	
	Non-Vaccinates	Vaccinates	Non-Vaccinates	Vaccinates
N25			10	13
N50			1	
I25			2	1
+25	3	4	14	24
I50	6	3	10	13
+50	12	13	20	36
I100	4	7	14	6
+100	11	14	13	10
I200	10	13	3	1
+200	122	84	54	28
or higher				
TOTALS	168	138	141	132

Brucellosis Eradication

**FIGURE 1**

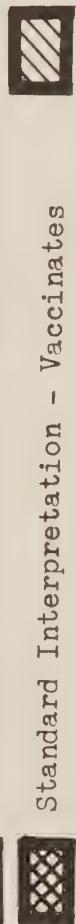
PERCENTAGE OF BRUCELLA RECOVERIES  
FROM SUSPICIOUS AND REACTOR CATTLE  
IN PROVEN INFECTED HERDS



U. S. DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

Without Titer Tolerance Vaccinates



Standard Interpretations - Non Vaccinates



# AN APPRAISAL OF BRUCELLOSIS ERADICATION GOALS AND CURRENT RESEARCH

## Report of the Subcommittee on Research by C. A. Manthei, Chairman\*

The first part of this report will be a deviation from past reports of this Subcommittee. Members of the Subcommittee on Research considered it appropo to express our thinking at this time about present and future goals and programs on eradication of brucellosis.

Based on available knowledge developed through research and demonstrated accomplishments through control and eradication programs in many states, eradication of brucellosis is an economically feasible goal. If there is a deterrent to reaching this goal, it is complacency because there is no lack of reliable tools or ability to apply them properly.

The gateway to achieving the goal of eradication is to attain modified certified status in all states with the least possible delay. We have two excellent screening procedures, milk ring testing and market cattle testing, for locating the herds suspected of having brucellosis. In this way the major effort of regulatory officials can be concentrated on applying either the standard tube or plate agglutination test in the suspect herds. Both tests are highly reliable and will identify all but the exceptional infected animal. Most of these exceptional infected animals do not show any clinical or convincing serological evidence of disease and many of them are located in problem herds. The milk ring and market cattle testing procedures are just as efficient in maintaining as attaining a modified certified status.

It is only after a State achieves the modified certified status that its disease control official can adequately develop and conduct a problem herd program, which is the next logical step toward attaining a brucellosis-free status. For a problem herd program to be successful it requires the services of well qualified epidemiologists. The epidemiologists is trained to determine the underlying causes for persistence of brucellosis in problem herds, to develop complete herd histories and to properly apply the supplemental diagnostic tests. Reliable bacteriological procedures for isolation of Brucella from secretions and excretions also are available and practical when needed. Both the supplemental diagnostic tests and isolation procedures can be supported by laboratory methods for characterizing and classifying Brucella isolates. Knowing the characteristics of Brucella isolates aids the epidemiologist many times in tracing and eliminating the source of infection. A number of States are successfully eradicating brucellosis from their problem herds or keeping their number at a minimum by properly applying the necessary diagnostic and supplemental tests, bacteriological and quarantine procedures and sanitary measures.

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\*Dr. Manthei is Director of the U. S. Department of Agriculture's National Animal Disease Laboratory at Ames, Iowa. Other members of the Subcommittee are: Robert K. Anderson, I. H. Borts Norman B. McCullough, and S. H. McNutt.

The successful attainment of a modified certified status and elimination of problem herds brings the program to the point of a brucellosis-free status. Even though we reach a brucellosis-free status, it will be necessary to continue surveillance until no further evidence of brucellosis exists. This can be done economically, practically and efficiently by properly utilizing milk ring and market cattle testing procedures. Competent epidemiologists should be available to promptly localize and eradicate any inadvertent infection that may occur.

There has been no intent by this Subcommittee to neglect giving credit to the important part that Strain 19 vaccination has had in controlling bovine brucellosis in this country. We recognize that the continued use of Strain 19 vaccine in heifer calves has played a significant role in lowering the incidence of brucellosis in our cattle population to a level where the states could attain a modified certified status more economically and rapidly than they could have otherwise. Furthermore, we believe that Strain 19 vaccine can still fulfill this role if heifers are vaccinated as near to 4 months of age as possible so that vaccinal titers will not persist and interfere with the accurate diagnosis of virulent Brucella infection should it occur.

At the 68th Annual Meeting of the United States Livestock Sanitary Association, its Committee on Brucellosis gave extensive consideration to the reduction or elimination of agglutination titer and age tolerances of official vaccines. We considered making such action effective after January 1, 1967, approximately two years hence. Before taking final action on the proposal, however, the Committee requests the Subcommittee on Research of the National Brucellosis Committee to evaluate the available data bearing on this question and report its findings and recommendations to the next annual meeting of the United States Livestock Sanitary Association.

Informal discussions were had with individuals who attended the Brucellosis Research Conference to determine the feasibility of fulfilling this request. It appears that these data are available, but before the Subcommittee proceeds further with the matter it should have the concurrence of the National Brucellosis Committee.

The concluding paragraph of this report will be a short discussion of current research programs. We do not believe it is an understatement to say that there are no major brucellosis research programs in progress now at any of the research institutions in this country. There are, however, research programs which are being actively pursued but limited in scope. The opposite research situation exists in many foreign countries where brucellosis is still one of their major economic diseases.

Areas of research that are being investigated are 1) isolation, purification and characterization of cellular antigens, 2) utilization of purified antigens in the development of nonviable, specific immunizing products, 3) development of diagnostic procedures that are more specific than those

now in use, 4) investigation of better ways of utilizing our present diagnostic tests, 5) development of more precise methods of characterizing and classifying *Brucella* isolates and 6) determination of minimum age that heifer calves can be vaccinated with Strain 19 vaccine and yet maintain a relatively high degree of induced immunity with no residual serum agglutination titers.

This last mentioned research should be nearing completion in early 1966. Many of the results from some of the other areas of research will not have immediate application but will develop new principles which can be applied at some future time.

# HUMAN BRUCELLOSIS IN THE UNITED STATES

1964

James H. Steele, D.V.M., M.P.H., Chairman  
Public Health Subcommittee\*  
National Brucellosis Committee

## Introduction

The downward trend in numbers of cases of human brucellosis which has been apparent since 1947, appears to have leveled off at the 1962 level. In 1964, the States reported 405 (preliminary data) cases to the Communicable Disease Center. In 1963, 407 cases were reported and in 1962, 409 cases (Fig. 1). The decline from 1947, when over 6,000 cases were reported, to the present time has been remarkable and is a tribute to the effectiveness of the national brucellosis eradication program. In approximately half of the human cases on which we have epidemiologic data, swine were the most probable source of infection.

## Geographic and Temporal Distribution

The distribution of cases in 1964 was similar to that in 1963 (Fig. 2, 3). Seventeen States did not report any cases during 1964. Iowa reported the greatest number of cases, 114; Texas and Illinois were next with 30 cases each. Even though Iowa reported more cases than any other State the 1964 figure, 114 is a marked decrease from the 155 cases reported in 1963. During 1964, as compared to 1963, there were sharp increases in numbers of cases in South Dakota where cases jumped from 10 to 22 and in Texas from 16 to 30.

For the entire United States, based on the experience of the last 10 years, fewer cases than expected were reported in March, May, and June (Fig. 4). The distribution of cases for the rest of the year was as expected.

## Epidemiologic Summaries

At the time this report was prepared, detailed brucellosis surveillance reports had been received on 200 of the 405 cases reported to the Communicable Disease Center. Analyses of these 200 reports is summarized in Tables 1 and 2.

In 1964, brucellosis continued to be an occupational disease of men; only 12 (6%) of the cases were in women. One hundred twenty-nine (64%) of the infected persons were urban residents and 55 (27%) were rural. This is a reflection of the higher risk of packing house workers as opposed to livestock raisers and handlers (Table 3).

Packing house workers were again the most often infected single occupational group; they account for 117 of the 200 cases (58.5%). All of these cases were in males, and the most probable source of infection for 76 of 117 (65%) was swine.

\*Dr. Steele is Chief of the Veterinary Public Health Section, Communicable Disease Center, Atlanta, Georgia 30333. Other members of Subcommittee are: Robert Barr, W. M. Decker, Raymond L. White, Stanley Hendricks, S. P. Leinback.

Of the other cases on which epidemiological data are available, 30 (15%) were in livestock farmers. Fourteen cases were due to exposure to cattle; 8 to swine, and 5 to either cattle or swine.

Eight of the total cases (4%) were in veterinarians, the third most heavily attacked occupational group. Their most probable sources of infection were evenly divided between swine and cattle. In 1964, none of the 8 cases reported were due to accidents, either in the laboratory or from vaccine, while in 1963, 7 of 12 cases were from this cause.

Iowa: During 1964, the designation of *Brucella* isolates from swine previously referred to as *Brucella melitensis* in Iowa reports was changed to *B. suis* type III. This change was made on the basis of oxidative metabolic tests which showed the new identification was more accurate.

South Dakota: This State reported a case due to an accident with Strain 19 vaccine. On January 18, this patient, a rancher, had a titer of 1:112 which by February 10 had reached 1:488. His physician reported the patient was asymptomatic at the latter date.

Utah: This State reported three cases in which the most probable source of infection was raw milk. These were an 11-year-old girl, a 14-year-old boy, and a 25-year-old man. The last case had milked cows in Mexico, where he drank raw milk.

California: Six of the nine cases on which detailed epidemiological data is available were in packing house workers, and four of these six worked extensively with swine. One student was infected while working with *B. suis* in the laboratory.

Illinois: Of the 18 cases reported on epidemiological surveillance reports, 14 were in packing house workers, and 2 patients had done obstetrical work on cattle without using gloves or antiseptics.

Massachusetts: Epidemiological reports were received on the two cases reported. The first case was in a farmer, who was probably infected by his swine herd from which 17 of 36 animals were reactors, 5 with two plus or greater reactions. The second patient traveled in Italy and Sicily where she drank goat milk in her tea. After she became ill, *B. melitensis* was isolated by blood culture, and her agglutination titer was 1:2586.

### Conclusions

The control of bovine brucellosis has resulted in a remarkable decline in the number of human brucellosis cases and no doubt the number of human cases due to *Br. abortus* will become less and less. The most important source of human infection today is diseased swine. Special efforts are being made to eliminate the disease in swine with emphasis on garbage-fed swine where unusually high rates of infection have been observed. Brucellosis can be eradicated in man, but it is dependent on eradication of the disease in animals, especially swine.

Table I

HUMAN BRUCELLOPSIS CASES - 1964  
BY OCCUPATION AND RESIDENCE

OCCUPATION	URBAN		RURAL		RESIDENCE		TOTAL
	Male	Female	Male	Female	Male	Female	
Packing House Worker	101	-	15	-	1	-	117
Rendering Plant Worker	1	-	-	-	-	-	1
Stockyard Worker	2	-	1	-	-	-	3
Farm Workers:							
Livestock Farmers	2	-	28	-	-	-	30
Dairy Farmers	-	-	1	-	-	-	1
Farmers Unspecified	-	-	2	-	-	-	2
Wives and Children:							
Housewives	-	4	-	1	-	-	5
Students	2	1	2	1	-	-	6
Children (under 12)	1	1	1	-	-	-	3
Professional:							
Veterinarians	7	-	1	-	-	-	8
Other	1	-	-	1	-	-	2
Other Occupations:							
Meat Associated	4	1	1	-	-	-	6
Miscellaneous	4	-	3	-	-	-	7
Not Stated	4	2	-	-	3	-	9
TOTAL	129	9	55	3	4	-	200

DHEW-PHS-CDC

Atlanta, Georgia, February 1965. Preliminary data based on 200 case histories of 405 cases reported to CDC.

Source: Epidemiologic Case Histories submitted to the Communicable Disease Center by various State Health Departments.

Table 2

HUMAN BRUCELLOSIS CASES - 1964  
BY OCCUPATION AND PROBABLE SOURCE OF INFECTION

OCCUPATION	PROBABLE SOURCE OF INFECTION						Total	Recrudescence	Possible Recrudescence
	Swine	Cattle	Cattle and Swine	Sheep or Goat	Packing House	Raw Milk			
Packing House Worker	76	10	26	-	4	-	1	-	-
Rendering Plant Worker	-	-	1	-	-	-	-	1	-
Stockyard Worker	3	-	-	-	-	-	-	3	-
Farm Worker:									
Livestock Farmer	8	14	5	-	-	-	1	-	-
Dairy Farmer	-	1	-	-	-	-	-	1	-
Farmers Unspecified	-	-	-	-	-	-	-	2	1
Wives and Children:									
Housewives	-	-	-	-	-	-	1	-	-
Students	-	1	1	-	-	1	2	-	-
Children (under 12)	-	-	1	-	-	1	-	1	-
Professional:									
Veterinarians	2	2	4	-	-	-	1	4	5
Other:	-	-	-	-	-	-	-	8	2
Other Occupations:									-
Meat Associated	-	1	4	1	-	-	-	6	-
Miscellaneous	1	3	1	-	-	1	-	1	-
Not Stated	-	1	1	-	-	2	1	4	1
<b>TOTAL</b>	<b>90</b>	<b>33</b>	<b>44</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>15</b>	<b>200</b>	<b>5</b>
									<b>4</b>

DHEW PHS-CDC

Atlanta, Georgia, February 1965. Preliminary data based on 200 case histories of 405 cases reported to CDC.

Source: Epidemiologic Case Histories submitted to the Communicable Disease Center by various State Health Departments.

Table 3

HUMAN BRUCELLOSIS IN PACKING HOUSE WORKERS  
1958 - 1964

YEAR	TOTAL CASES REVIEWED	CASES IN PACKING HOUSE WORKERS	PERCENT OF TOTAL
1958	369	104	28
1959	658	155	24
1960	555	221	40
1961	413	174	42
1962	276	115	42
1963	257	122	48
1964	200*	117	59

\*Preliminary data.

DHEW-PHS-CDC  
Atlanta, Georgia. February 1965.

Table 4: REPORTED BRUCELLOSIS MORBIDITY

State	1959	1960	1961	1962	1963	1964
Alabama	7	16	2	7	5	4
Alaska	2	-	1	2	-	-
Arizona	*	6	3	3	6	4
Arkansas	12	9	19	*	11	9
California	11	29	20	*	28	19
Colorado	11	2	3	-	-	-
Connecticut	*	1	2	4	2	-
Delaware	*	1	-	-	-	-
Dist. of Col.	-	-	-	-	1	-
Florida	5	3	10	7	4	4
Georgia	*	32	5	14	14	17
Hawaii	1	-	1	1	2	-
Idaho	3	*	3	-	1	-
Illinois	71	74	59	57	26	*
Indiana	9	*	9	5	5	1
Iowa	361	308	219	105	155	114
Kansas	112	48	58	22	*	8
Kentucky	12	6	2	1	*	4
Louisiana	10	14	13	10	10	5
Maine	*	-	1	-	**	1
Maryland	*	-	1	1	2	-
Massachusetts	*	1	1	2	1	-
Michigan	*	15	5	9	6	6
Minnesota	*	20	15	19	14	11
Mississippi	15	9	11	2	2	3
Missouri	8	8	1	4	*	14
Montana	-	3	3	1	1	*
Nebraska	23	20	32	15	6	13
Nevada	*	-	1	-	-	1
New Hampshire	*	-	-	**	1	-
New Jersey	*	5	3	2	1	-
New Mexico	*	1	1	2	-	1
New York	*	17	9	11	5	9
North Carolina	*	4	4	8	-	6
North Dakota	17	9	2	2	1	*
Ohio	3	4	4	1	-	5
Oklahoma	3	5	11	7	5	10
Oregon	*	1	3	2	2	2
Pennsylvania	*	8	6	4	2	3
Rhode Island	*	-	1	-	-	**
South Carolina	1	1	-	*	-	-
South Dakota	11	26	18	15	12	22
Tennessee	*	17	10	13	10	6
Texas	13	22	14	10	16	30
Utah	*	2	12	7	5	** 26##
Vermont	*	-	-	1	1	-
Virginia	27	34	18	*	13	12
Washington	*	1	-	3	-	1
West Virginia	*	-	-	-	-	-
Wisconsin	*	13	5	3	8	11
Wyoming	-	-	2	1	1	-
<b>Totals</b>	<b>893</b>	<b>750</b>	<b>636</b>	<b>409</b>	<b>407</b>	<b>405#</b>

\* Modified Certified Brucellosis States.

# Provisional

\*\* Certified Brucellosis-free area.

## Analysis of data incomplete

Figure 1.

REPORTED HUMAN BRUCELLOSIS  
UNITED STATES, 1947-1964

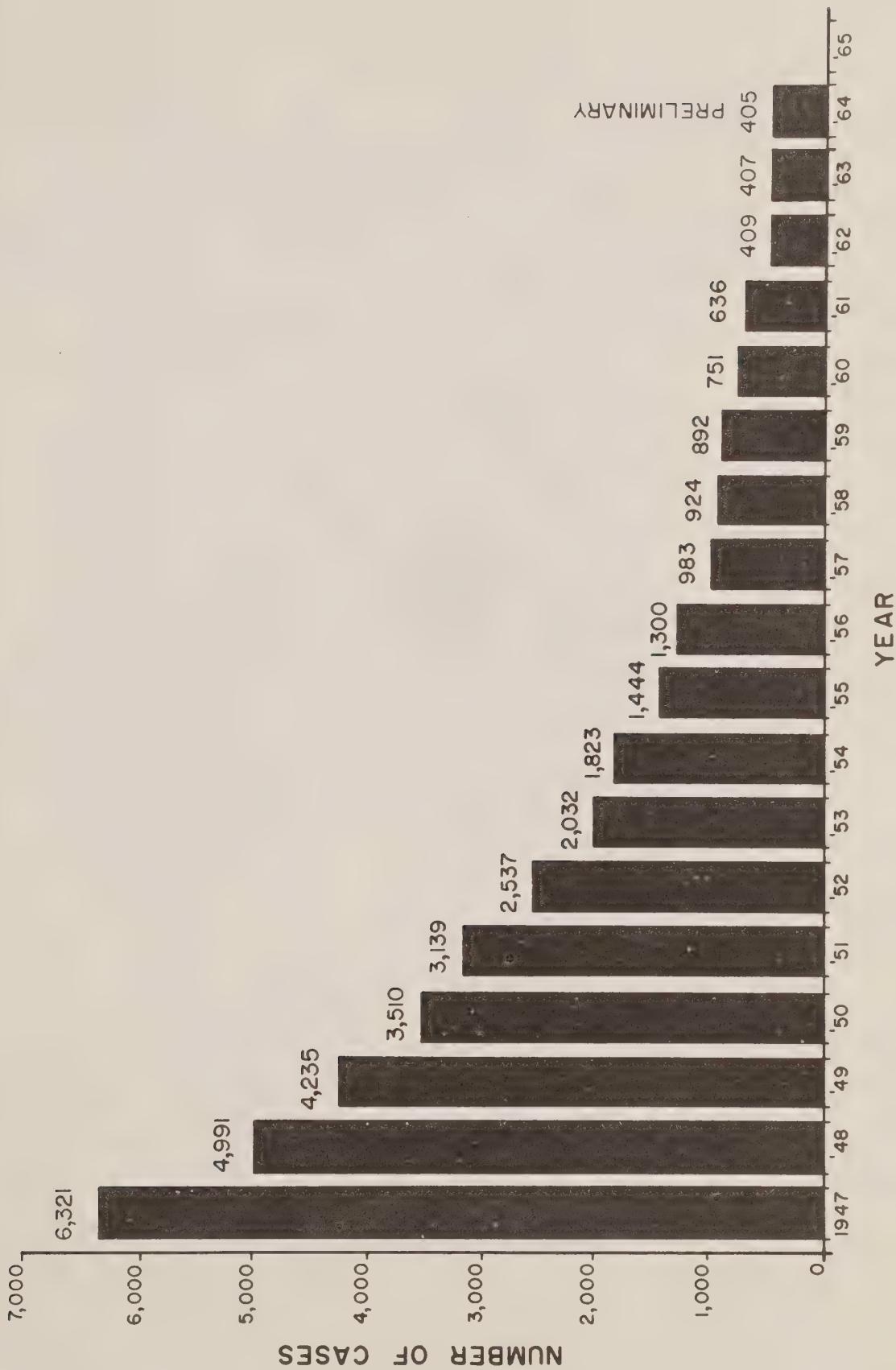


Figure 2.

REPORTED BRUCELLOSIS CASES  
UNITED STATES, 1963

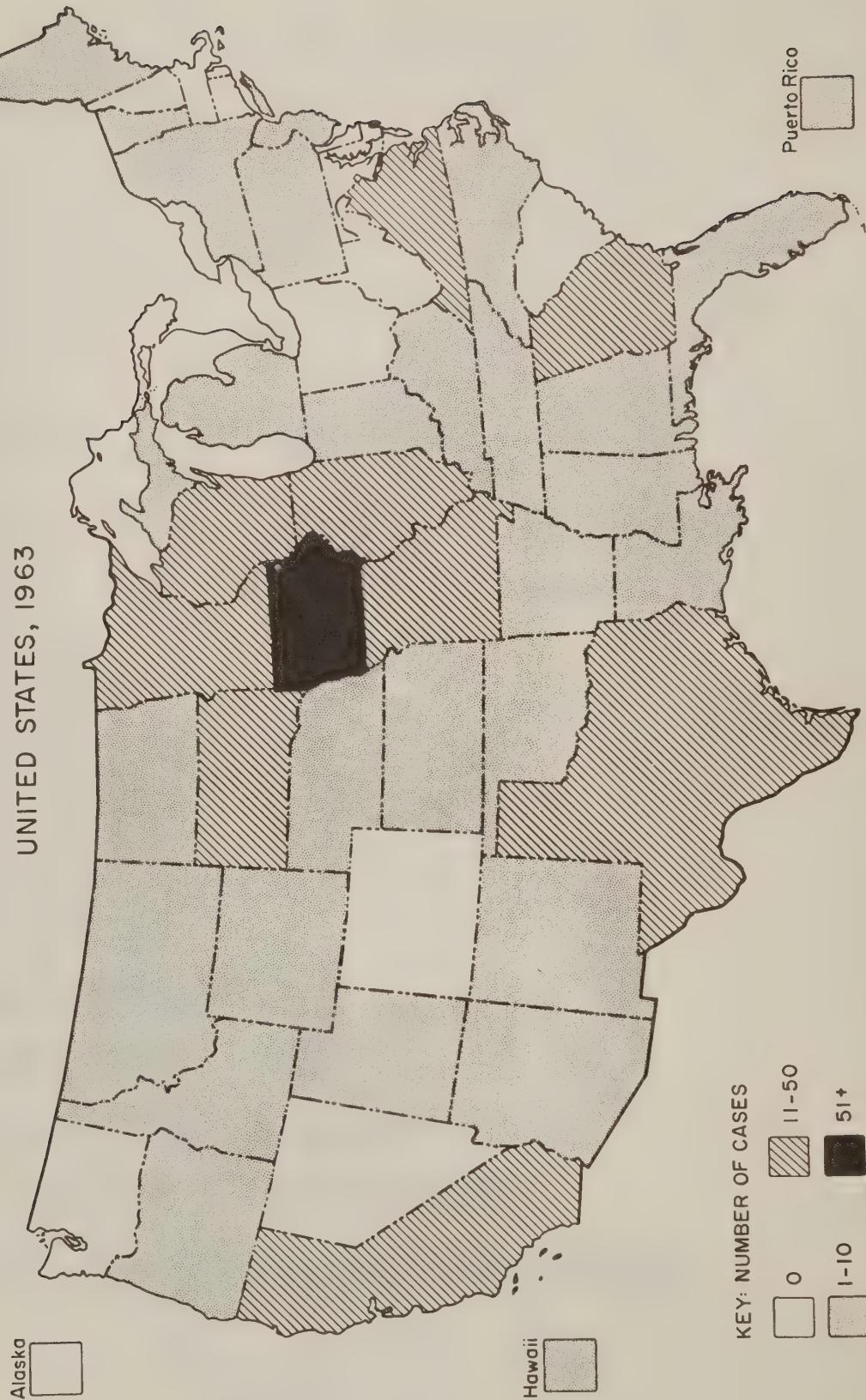


Figure 3.

**REPORTED BRUCELLOSIS CASES**  
UNITED STATES, 1964

Alaska

Hawaii

KEY: NUMBER OF CASES  
 0       11-50       51+  
 1-10

Puerto Rico

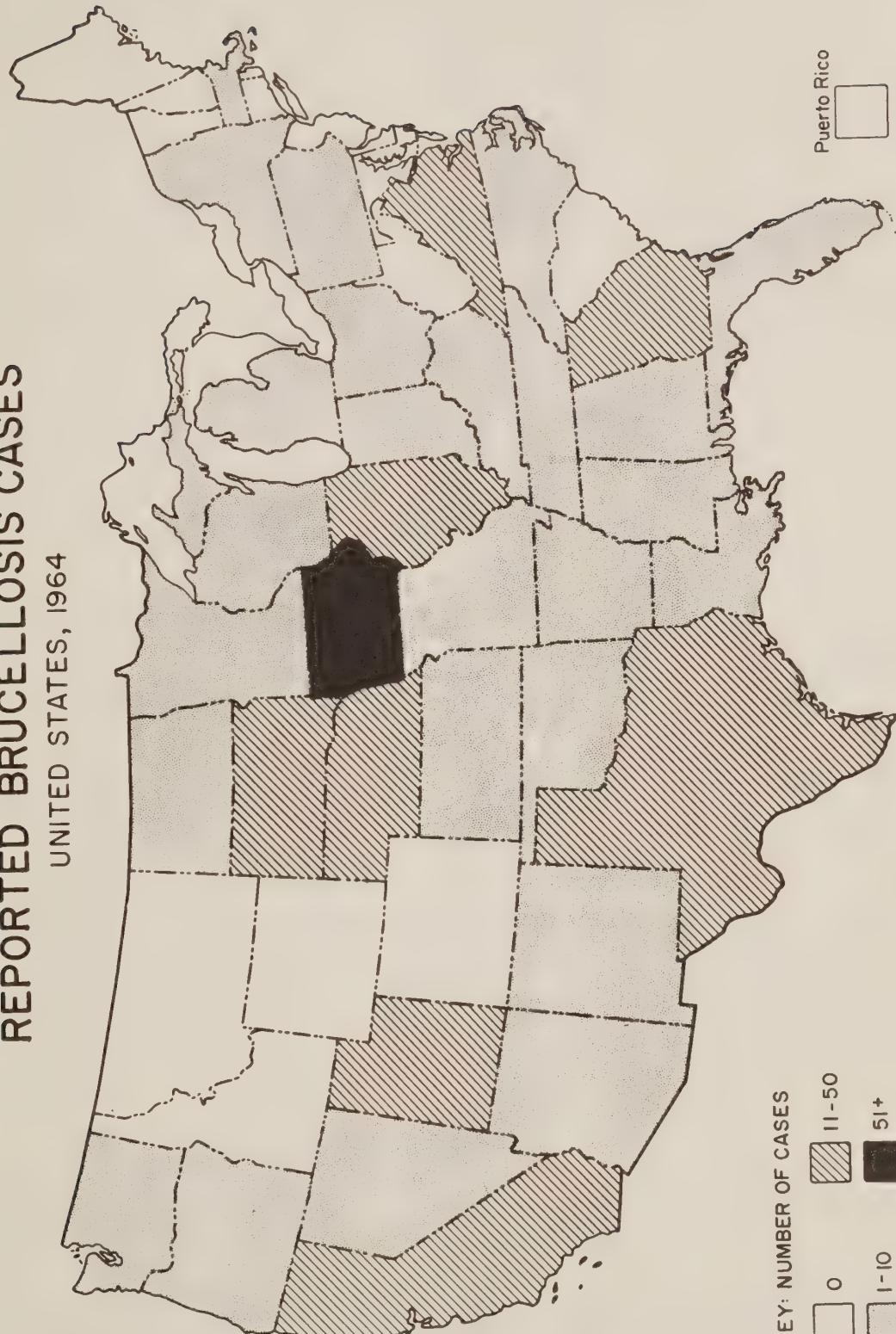
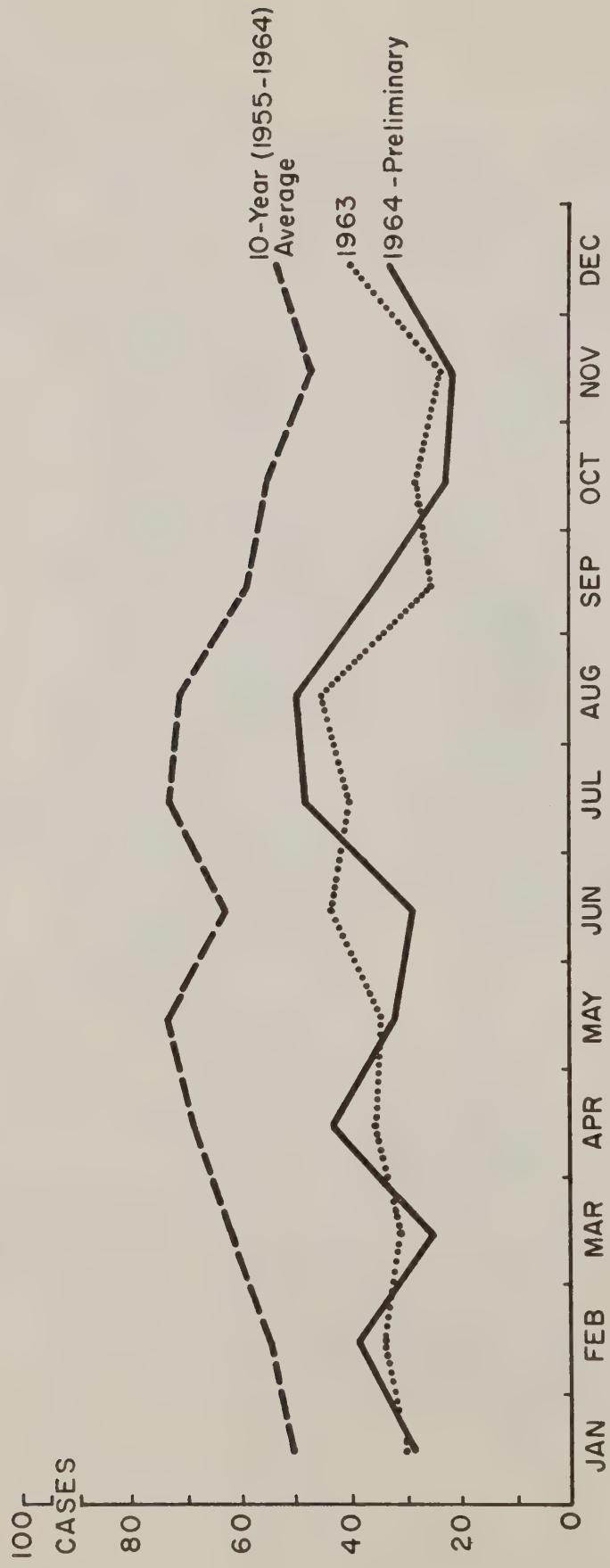


Figure 4.

Seasonal Trends of  
REPORTED HUMAN BRUCELLOSIS



SOURCE: 1955-1964, NOVS/CDC Annual Supplements  
1964, CDC Weekly Morbidity & Mortality Reports

## INFORMATION AND EDUCATIONAL ACTIVITIES EXPANDED

### Subcommittee on Information and Education of the National Brucellosis Committee

by  
Herman Aaberg, Chairman\*

The past year's informational and educational activities emphasized four major needs within the cooperative State-Federal brucellosis eradication effort.

- The need to expand and to utilize the market cattle testing procedure for blood sampling identified beef cows during the marketing-slaughtering process.
- The need to maintain a strong milk ring testing program to screen dairy herds for the presence of brucellosis.
- The need to employ these two highly efficient surveillance programs to eradicate--not control--brucellosis from cattle.
- The need to accelerate the Swine Validated Brucellosis-Free Herd program throughout the Nation.

During the year, each significant advancement on the brucellosis eradication campaign was given national publicity in the daily press, farm magazines, radio, and television media.

A partial list of these developments include:

Rhode Island Qualifies as a Brucellosis-Free Area (March 23, 1964)

Illinois Attains a Modified Certified Brucellosis status (April 9, 1964)

Montana is 35th State to achieve a Modified Certified Brucellosis status (May 15, 1964)

Ohio now Modified Certified Brucellosis Area (July 13, 1964)

Utah is First Western State to Eradicate Brucellosis (July 30, 1964)

Two New Market Testing Plans for Eradicating Brucellosis (January 15, 1965)

Connecticut Free of Brucellosis; New England Leads Nation in Fight on Brucellosis (February 5, 1965)

Vermont is First State to Qualify as a Validated Brucellosis-Free Area (February 14, 1965)

All available informational tools were used to publicize improvements in eradication methods. For example, when Minnesota developed a livestock identification procedure for using one backtag to screen a cow for two diseases--brucellosis and tuberculosis--the following actions were taken:

Illustrated feature articles were prepared for and used by the National Provisioner magazine, the Farm Journal magazine, and the USDA's Agricultural Research publication. The National Provisioner article is being reprinted--the first distribution to the States requires 10,000 copies.

\*Mr. Aaberg is Assistant Director, Commodity Division, American Farm Bureau Federation. Other members of the committee are: R.E. Burleson, N.J. Post, H.S. Nicol, C.G. Scruggs, and Paul Zillman.

A tape recorded interview with Dr. D. F. Werring, Minnesota's Federal Veterinarian in Charge of Animal Disease Eradication, was distributed through USDA's Agri-Tape outlet to more than 300 of the Nation's radio farm directors.

During the U.S. Livestock Sanitary Association's annual meeting, it was arranged for Dr. D. F. Werring to appear on a local television farm oriented program to discuss the MCT program in his State.

Arrangements were made with the editorial staff of The Farmer magazine to interview Minnesota livestock sanitary officials. The magazine featured this new procedure under the title "Back Tags Now Used To Fight Both Brucellosis and TB."

Visuals were supplied to the University of Minnesota, College of Agriculture for use in the preparation of a 28-minute television program featuring Dr. J. G. Flint, State Veterinarian, and Dr. D. F. Werring, Minnesota's Federal Veterinarian in Charge. Program was moderated by Ray Wolf, Extension Information Specialist.

The procedure at South St. Paul was documented with color photography and colored slides prepared. A narration was developed to explain the procedure in detail. This colored slide narration has been made available to every State and Federal Veterinarian in each State for their review. If additional sets of slides are requested, they are supplied.

To facilitate explaining Minnesota's MCT procedure before small groups, a flip chart, illustrated with photographs and explained by legends, has been prepared. All the field stations have been advised that these are available upon request.

To help establish the educational concept of livestock disease eradication, a narration illustrated with 45 colored slides has been prepared.

The script documents the evolution of the cooperative State-Federal brucellosis eradication program. These illustrated narrations have been mailed to every State for their review. States are encouraged to make a special effort to keep vocational agriculture teachers and their students informed of livestock disease eradication procedures and accomplishments. These slide sets may be obtained in limited quantities for mailing to vocational agricultural teachers on a rotational basis. Of course, these slide-illustrated narrations would be of interest to other livestock producers, marketing and slaughtering organizations.

This year, for the first time, an arrangement was made with the Farmers Home Administration for the distribution of informational pieces to each of their 1600 county offices serving more than 150,000 farmers and ranchers. The County Supervisors were advised by their Administrator that this material would be forthcoming. They were strongly urged to support the brucellosis eradication effort.

The first mailing in November emphasized the elimination of swine brucellosis and included the mailing of 80,000 copies of the program aid Swine Brucellosis--How To Eradicate It and 32,000 copies of the program aid Swine Brucellosis and Human Health. Also, 160,000 copies of the envelope stuffer, Don't Let Swine Brucellosis in the Back Door were distributed.

A second mailing in January 1965, stressed the eradication of cattle brucellosis. At this time, 32,000 copies of the program aid Market Cattle Testing and 160,000 envelope stuffers entitled Time to Fix the Fence were distributed.

This program is projected for two additional mailings--one in March; another in May--at which time a total of 446,000 copies of informational material will be distributed.

A similar cooperative arrangement with the Federal Extension Services resulted in the distribution of more than 100,000 envelope stuffers designed to develop interest in establishing Validated Brucellosis Free Swine herds.

As usual, the cooperative efforts of the State and Federal Veterinarians in each State were responsible for the planned and effective distribution of material to specific groups and organizations. For example, 35,000 copies of the program aid What you Should Know About Market Cattle Testing for Brucellosis were distributed in this manner.

The most recently produced movie concerning Bovine Brucellosis entitled Market Cattle Testing for Brucellosis was shown more than 50 times on television to an estimated audience of nearly 3 million persons. Of the eight movies pertaining to brucellosis, five were shown to television audiences exceeding 1 million persons. The total estimated TV audience was 10 million.

Material was prepared for Farm Quarterly magazine explaining the philosophy of animal disease eradication, diseases we have eradicated and those presently involved in an active eradication campaign. Illustrations were provided. Interviews were established with key personnel in animal disease eradication activities. Photographic arrangements were made in Wisconsin and New York. This resulted in a well illustrated feature article, entitled We Can Eradicate Disease, reporting in depth on all major disease eradication campaigns.

The first revision of the National Listing of Validated Brucellosis-Free Herds was issued in June of 1964. A total of 15,000 copies of the listing was distributed through the States by Federal Extension Service and State and Federal Veterinarians. The listing contained the names of 1,545 herd owners from 37 states and Puerto Rico.

As a service to the swine industry, the National Hog Farmer magazine has constantly publicized the Validated Brucellosis-Free Herd program by carrying a list of newly qualified herd owners each month.

The use of the approved "card test" was demonstrated to swine producers at the National Barrow Show at Austin, Minnesota, and at the National Pork Industry Conference at Kansas City, Missouri. Publicity on the use of the card test was carried in the National Hog Farmer magazine as well as in six of the 8 major swine breed association magazines.

The validated brucellosis-free herd exhibit was used at fairs and swine conferences in Colorado, New Mexico, Missouri, Kansas, Iowa and Kentucky during 1964. Two States, South Dakota and New York, were assisted in the planning and development of exhibits for State Fair audiences.

PROPOSALS BY THE U. S. LIVESTOCK SANITARY ASSOCIATION

ON BRUCELLOSIS ERADICATION

by

A. O. Wilson\*

The committee recommended alternate procedures for the certification and the recertification of Brucellosis-free areas which were approved by the USDA's Agricultural Research Service, Animal Disease Eradication Division on December 17, 1964.

As a result, Part V, Section I and II of the Uniform Methods and Rules were revised as follows:

PART V: CERTIFIED BRUCELLOSIS-FREE  
AREA PLAN

The provisions of the individual certified herd plan that relate to quarantining, cleaning and disinfection shall apply to Certified Brucellosis-Free Areas. The official tube agglutination test shall be utilized in all blood serum agglutination tests conducted in relation to establishing and maintaining Certified Brucellosis-Free Areas. Animals classed reactor must be immediately marketed for slaughter in accordance with Section II, paragraph A, subparagraph (7) of this PART. Cattle maintained in accordance with Section I, paragraph A, subparagraph (11), of this PART, need not meet the requirements of any other paragraph of Section I or Section II. (Steers, spayed heifers, and calves under eight (8) months of age are exempt from the requirements of this PART.)

Section I. Establishing Certified Brucellosis-Free Areas

A. Certification Procedures

Areas may qualify as Certified Brucellosis-Free for a period of five (5) years provided:

- (1) They are located in a State in which all areas have current Modified Certified Brucellosis Area status.
- (2) They have qualified on the basis of one or more of the following procedures, applied within not more than three (3) years or less than eighteen (18) months immediately preceding the request for Certified Brucellosis-Free status:

\*Mr. Wilson is chairman of the USLSA's Committee on Brucellosis. Other members are: J.V. Smith, Hartford, Connecticut; G. Apple McKinney, Texas; T. Arnold, Alliance, Nebraska; J.R. Bishop, Atlanta, Indiana; J.S. Brenner, Grant, Montana; G.B. Estes, Richmond, Virginia; J. B. Finley, Encinal, Texas; R.G. Garrett, Austin, Texas; A.E. Janawicz, Montpelier, Vermont; W.D. Knox, Fort Atkinson, Wisconsin; R. Laramore, Gillette, Wyoming; V. H. Magatagan, Albuquerque, New Mexico; C. A. Manthei, Ames, Iowa; J.L. McAuliff, Cortland, New York; R. J. McClenaghan, Ottawa, Canada; S. H. McNutt, Madison, Wisconsin; C.K. Mingle, Hyattsville, Maryland; L.A. Rosner, Jefferson City, Missouri; and W.C. Tobin, Denver, Colorado.

- a. At least three consecutive semi-annual brucellosis ring tests on all milking herds in the area;
- b. Market cattle testing in which the equivalent of at least fifteen (15) percent of the breeding beef-type cows, three (3) years of age or over in each non-milking herd in the area are blood tested during a three (3) year period; or, market cattle testing in which the equivalent of at least thirty (30) percent of the breeding beef-type cows, three (3) years of age or over in the area are tested within a three (3) year period, with at least ninety (90) percent of the reactors disclosed being traced to herds of origin;
- c. A blood test of a sample group of breeding cows in each herd over three (3) years of age, the sample to contain enough animals to provide a ninety-five (95) percent probability of finding brucellosis at the two (2) percent level of disease incidence among the animals tested (Graph CA 4-4);
- d. Complete herd blood tests.

(3) All brucellosis milk ring test suspicious herds have been blood tested.

(4) Not more than one (1) percent of the herds, or one (1) herd, whichever is greater, shall have been found to be infected during the eighteen (18) months immediately preceding the request for Certified Brucellosis-Free Area status.

(5) Not more than two-tenths of one (0.2) percent of the cattle shall have been found to be reactors during the eighteen (18) months immediately preceding the request for Certified Brucellosis-Free Area status.

(6) All suspects to the blood serum agglutination test shall:

- a. have been retested negative,
- b. have had at least two (2) retests not less than thirty (30) days apart in which it has been established that the blood serum titers are stabilized or receding,
- c. be a part of a herd included under subparagraph (2) (a), or (b), above, or,
- d. if the suspects have been consigned to slaughter and are not available for retest, the herd shall be retested or be included under subparagraph (2) (a), or (b), above.

(7) All herds in which brucellosis has been known to exist have been legally released from quarantine.

(8) All herds in which brucellosis has been found during the latest certification period shall have been retested not less than three (3) months following removal of the last reactors, or be a herd included under subparagraph (2) (a), or (b), above.

- (9) A system employing positive identification of all slaughter cows and bulls over thirty (30) months of age, whether of beef or dairy breeds, moving in intrastate and interstate commerce, shall have been initiated in the area.
- (10) All herds of other species of domestic livestock in which brucellosis has been found or suspected have either been tested negative or eliminated, leaving no known foci of infection.
- (11) Beef-type cattle may be maintained for purpose of dry lot feeding in Certified Brucellosis-Free Areas, or in areas seeking such status, provided they are inspected on the premises where held under quarantine, and are moved to slaughter under permit at the end of the feeding period.

## Section II. Maintaining Certified Brucellosis-Free Areas

### A. Recertification Procedures

Certified Brucellosis-Free Areas may be recertified provided:

- (1) All herds in the area are represented in one (1) or more of the following procedures:
  - a. Brucellosis milk ring testing conducted at least semi-annually on all milking herds in the area;
  - b. Market cattle testing in which at least twenty-five (25) percent of the breeding cows over three (3) years of age in each non-milking herd in the area are tested over the five (5) year certification period; or market cattle testing in which fifty (50) percent of the area non-milking breeding cow population over three (3) years of age are tested during the five (5) year certification period;
  - c. A blood test of a sample group of the breeding cows over three (3) years of age, the sample to contain enough animals to provide a ninety-five (95) percent probability of finding brucellosis, if present, at the two (2) percent level of disease incidence among the animals tested. The blood test is to be conducted within eighteen (18) months prior to the termination of the certification period.
  - d. A complete herd blood test conducted within eighteen (18) months prior to the termination of the certification period.
- (2) All brucellosis milk ring test suspicious herds have been blood tested.
- (3) All herds included in subparagraph (1) (b), or (c), above, in which it has been established that brucellosis exists are blood tested.

(4) The number of herds found infected during the entire certification period does not exceed one (1) percent of the area herd population, or one (1) herd, whichever is greater. If the area is making a concerted effort through effective screening programs and extensive epidemiology to locate infected herds and eradicate the disease, only the infection disclosed during the last eighteen (18) months of the certification period will be counted.

(5) Herds in which brucellosis has been found have been retested and legally released from quarantine, and, in addition, have been retested not less than three (3) months following removal of the last reactors or be a herd included under subparagraph (1) (a), or (b) above.

(6) All suspects to the blood serum test shall:

- a. have been retested negative,
- b. have had at least two (2) retests not less than thirty (30) days apart in which it has been established that the blood serum titers are stabilized or receding.
- c. be a part of a herd included under subparagraph (1) (a), or (b), above, or,
- d. if the suspects have been consigned to slaughter and are not available for retest, the herd shall be retested or be included under subparagraph (1) (a), or (b), above.

(7) If any reactors are disclosed in Certified Brucellosis-Free Areas, they are to be consigned to slaughter. If they are to be marketed within a Certified Brucellosis-Free Area, they should be transported directly to the holding pens of a slaughtering establishment. In any event, they are not to be unloaded onto premises or into facilities within a Certified Brucellosis-Free Area which are utilized for holding or handling livestock for any other purpose than consignment for slaughter. Vehicles used for transporting reactors must be cleaned and disinfected under the supervision of a Federal or State inspector or an accredited veterinarian before again being used for transporting any other livestock.

(8) All herds of other species of domestic livestock in which brucellosis is suspected or found shall be placed under quarantine and retested until negative or be eliminated.

B. Area Requalification

If the percentage of infected herds exceeds the limit set forth in paragraph A, subparagraph (4), the area shall revert to Modified Certified Brucellosis Area status and must requalify in accordance with Section I of this PART.

Aside from the recommendations that are now a part of the Uniform Methods and Rules, the Committee considered several other aspects of the brucellosis eradication program. These include:

**RECOMMENDED AGES FOR VACCINATION:** Calves vaccinated at four months of age develop as great an immunity as do those vaccinated at a later date. Calves vaccinated at four months do not retain vaccine titers as do those vaccinated at later dates. For this reason it was recommended that calves be vaccinated as near to 4 months as possible and that research be conducted to determine if an earlier age could be employed.

**SEROLOGICAL AND AGE TOLERANCES FOR OFFICIAL VACCINATES:** The Committee gave extensive consideration to the reduction or elimination of the serological and age tolerance of official vaccines. We considered making such action effective after January 1, 1967, approximately two years hence. Before taking final action on the proposal, however, the Committee requested the subcommittee on Research of the National Brucellosis Committee to evaluate the ~~available~~ date bearing on this question and to report its findings and recommendations at the next annual meeting of the United States Livestock Sanitary Association.

**VACCINATION IMPORT REQUIREMENTS:** The Committee viewed with deep concern the action of those States that now require that cattle imports be calfhood vaccinated. Such laws and regulations do not serve the best interests of livestock health and the industry it serves. In some brucellosis free areas calfhood vaccination is being phased out. Import requirements that force vaccination in all areas makes more difficult, and actually delays, the complete eradication of brucellosis. We urged, therefore, that states with such import requirements reevaluate their policies. Further, we recommended that other states do not impose such restrictive import policies.

**CLEANING AND DISINFECTING OF BRUCELLA INFECTED PREMISES:** The Committee considered existing policies concerning the cleaning and disinfection of brucella infected premises and believe they should be modified in such a manner as to (1) require cleaning and disinfection under supervision of all problem herd premises following removal of reactors; (2) permit cleaning and disinfection in other brucella infected herds to be the responsibility of the state and federal officials in the respective state involved.

**SWINE BRUCELLOSIS--HEALTH STANDARDS FOR BOAR STUDS:** The Committee endorsed that portion of the 1964 report of the Committee on Transmissible Diseases of Swine pertaining to the Health Standards for Boar Studs, particularly the part on requirements for freedom from brucellosis.

These brucellosis requirements are:

- A. Semi-annual brucellosis herd tests.
- B. All additions to stud must:
  1. Originate from validated brucellosis-free herds or have a negative brucellosis test status within 30 days prior to purchase; and originate from a herd in which all breeding animals have been tested and found negative to the brucellosis test within 6 months prior to purchase.

2. Be isolated from the boar stud for a minimum of 30 days.

C. Maintain a Validated Herd Status.

Brucellosis eradication will not be complete until the disease is eliminated from all species of livestock. While encouraging progress has been made to the bovine brucellosis eradication program, much remains to be done with respect to swine brucellosis. Exposures to *Brucella* infected swine now are becoming the most important source of infection for humans. The Committee endorses the herd and area validation programs and urges their expansion as rapidly as possible, with special emphasis being placed on the development of an effective market swine testing procedure.

**BRUCELLOSIS PROBLEM HERD PROGRAM:** The Committee recognized the importance of Brucellosis problem herds, particularly in the Modified Certified States that are moving directly toward final eradication. It has been demonstrated that the application of supplemental tests under the supervision of qualified brucellosis epidemiologists is extremely useful in freeing these herds of infection. Therefore, it is recommended that all Modified Certified States adopt, as quickly as possible, an effective problem herd program in which all available procedures will be applied as required.

At this time there are 24 Modified Certified States that are using the services of qualified epidemiologists in their problem herd program. Twelve Modified Certified States have not, up to this time, felt the services of these men essential to their program.

**ESTABLISHING BRUCELLOSIS-FREE BISON HERDS:** The Committee recognized the potential hazard to the Brucellosis Program of private and publicly owned domesticated Bison herds in states involved. It urged that such States, in cooperation with the USDA, take whatever action is necessary to establish these herds as Brucellosis-Free as soon as possible.

**MARKET CATTLE TESTING:** During the past few years the effectiveness and economy of screen testing programs has been fully demonstrated. Although the brucellosis ring testing program is providing reasonably good coverage of dairy herds, the market cattle testing program is in urgent need of expansion. The Committee believes that the testing of marketed animals is essential for completing the eradication of bovine brucellosis. It urged all states to expand this phase of the program as rapidly as possible. In several states where market cattle testing activities are well advanced, most of the down-the-road testing otherwise required for the recertification of areas has been eliminated.

**PROTECTING ADVANCES IN BRUCELLOSIS ERADICATION:** The encouraging progress made over the past several years in the Cooperative State-Federal brucellosis eradication program is reflected in the fact that 84.6 percent of the Nation's counties are now certified. However, there are still a few areas in the country where progress has been delayed. The hazards associated with movements of animals from noncertified areas is obvious, and the certified areas are becoming increasingly concerned about this problem. Therefore, the noncertified states are urged to complete their certification programs as quickly as possible, otherwise, increased restrictions on the intra and interstate movements of cattle may be necessary to protect the gains already made throughout the nation.

# THE COOPERATIVE STATE-FEDERAL BRUCELLOSIS ERADICATION PROGRAM

## A Progress Report by C. K. Mingle\*

The Nation is moving steadily toward its goal of brucellosis eradication under the cooperative State-Federal brucellosis eradication program. By the close of 1964, nearly 85 percent of the counties had attained certified status and over 10 percent of the counties had attained Certified Brucellosis-Free Area status. The speed with which the national goal is reached depends upon the effective use of the measures already at our disposal. As the incidence of the disease decreases, greater effort must be directed toward locating and eliminating small pockets of residual infection. The screening procedures and the problem herd program are essential tools in this phase of the program. Maximum utilization of these measures will provide the means to eradicate brucellosis from the cattle population by 1972.

### Certified Brucellosis-Free Areas

During the calendar year 1964, more counties achieved Certified Brucellosis-Free status than those achieving initial Modified Certified Brucellosis Area status. There were 104 free counties established and 76 modified certified counties. However, 8 counties lost their modified certified standing leaving a net gain of only 68.

In addition to the accomplishment of qualifying over 100 counties for Certified Brucellosis-Free Area status, the entire State of Utah has attained this status. This was the first major beef producing State to qualify as free under this program. This achievement proves that the Market Cattle Testing program is an effective screening test for the detection of brucellosis when diligently used. Utah is to be further commended for its accomplishment in attaining Validated Brucellosis-Free Herd status. Utah became the first State to eliminate brucellosis from both cattle and swine herds.

Connecticut has also achieved recognition as a brucellosis-free State. The remaining two modified certified counties completed the necessary testing to qualify as brucellosis-free counties during December 1964. The applications were processed and approved on January 15, 1965, making Connecticut the fifth State to eradicate bovine brucellosis.

### Modified Certified Brucellosis Areas

Four States completed the requirements for statewide Modified Certified Brucellosis Area status in 1964. Montana, Illinois, Ohio; and North

\* Dr. Mingle is Senior Staff Veterinarian of Cattle Diseases, Animal Disease Eradication Division, Agricultural Research Service, USDA, Federal Center Building, Hyattsville, Md.

Dakota attained this status and are now concentrating on the task of eliminating the last foci of infection. Thirty-eight States have been initially certified. However, both Indiana and Arkansas, unfortunately, lost their Modified Certified Brucellosis Area status when one county in each State failed to qualify for recertification on time, Indiana lost its certification for the second time because a high rate of infection was found in Warren County. Complete area testing is now in progress to re-qualify this county for modified certified status.

The loss of this county illustrates the weakness of the former provision in the Brucellosis Uniform Methods and Rules which permitted areas to qualify for recertification on the basis of a 20-percent test of the cattle in 20 percent of the herds. This method was discontinued on July 1, 1964. The situation in Arkansas is different but illustrates the deleterious effect one objector may have on the status of the entire State. The recertification of Cross County was delayed indefinitely pending a court decision concerning the objection of a rancher to test and remove reactors from his infected herd.

#### Milk Ring Test

Since the adoption of the brucellosis ring test (BRT) as a screening procedure for detecting dairy herds suspected of being infected with Brucella spp., the rate of infection among dairy herds has been drastically reduced. The effectiveness of this program is related to the interval between tests as well as the size of the herds being sampled. The efficiency of the ring test increases as the interval between tests is reduced from 6 to 4 months and is further improved when reduced to 3-month intervals. Forty-five States are now conducting the ring test either three or four times a year but only 16 of these States are performing the test at three month intervals. The States that are still conducting the ring test less than three times a year are strongly urged to consider the benefits to be derived from an increased frequency in testing. Thirty-five States reported 100-percent coverage of the dairy herds by the ring test and six additional States reported a coverage of 99 percent or better under this screening procedure, but the remaining states need to strengthen the ring test program to maintain maximum surveillance of the dairy herds. Extensive coverage under the ring test screening procedure is the most economical means to detect new outbreaks of brucellosis in this class of cattle. Almost half of the states reported that the ring test is utilized to screen herds marketing cream. The extent of the coverage on cream shippers varied from state to state with only four cream patrons being screened in one state to a maximum of 25,000 in another.

The greatest area for improving surveillance procedures under the ring test program appears to be in the interpretation of the significant level of reaction. This needs to be more closely correlated with the number of animals contributing to the milk sample. Forty-nine States and Territories are utilizing the Babcock sample or a fresh tank sample for ring test purposes but twenty-three states ignore the 1 + ring test reaction. Dilution factors, storage time and temperature, and preservatives can effect the sensitivity of the ring test. In view of this, failure to investigate

all possible leads resulting from reactions observed on the brucellosis ring test could delay the detection of a newly infected herd. It is recommended that all States review their procedures in the application of the ring test and make whatever changes are necessary to gain the maximum benefit from this phase of the program.

#### Market Cattle Testing Program

The market cattle testing (MCT) program has expanded rapidly in the last few years and during 1964 a definite trend has been established toward the collection of blood samples at the time of slaughter rather than at auction markets. A tremendous potential to screen eligible cattle from beef herds exists under this program. In the few years since the development of the market cattle testing program, significant progress has been made in range areas by detecting and eliminating brucella infection promptly. The continual surveillance which is possible under this program is as important to the beef areas as the ring test is in the dairy areas. In many of the States the market cattle program compliments the ring test by screening a number of the dairy animals previously covered under the ring test. Fourteen States reported that over 50 percent of the market cattle test samples were drawn from dairy type animals and an additional 11 States reported that between 10 and 50 percent of the MCT samples were collected from this class of cattle. The duplicate coverage is not necessary nor desirable from a cost standpoint in those States which have a well developed ring test procedure although animal identification is important for other cattle disease program activities.

Since March 15, 1963, 634 counties have been recertified under the market cattle testing program without requiring "down the road" testing to verify the low incidence of brucellosis. A recent amendment to the Brucellosis Uniform Methods and Rules now provides an alternate procedure whereby the MCT program can be even more extensively used in range and semirange areas to initially certify and recertify these areas as brucellosis-free. One of the serious handicaps under the former Brucellosis Uniform Methods and Rules to certify range and semirange areas as brucellosis-free was the necessity of verifying that each and every herd in the county was included in a screening program. The success of the market cattle testing program has proved that it is not necessary to account for each and every herd through posting of the negative test results if the percentage of eligible beef cattle screened each year is sufficiently high and effective means are available to trace not less than 90 percent of MCT reactors to a herd of origin.

Under the MCT system the status of many of the animals cannot be determined until after the animal has been traced to a herd of origin and an investigation conducted. The number of animals reclassified as suspects varies from State to State, depending to a large extent upon the level of calf vaccination which has been practiced in previous years. Twelve States have reported that they reclassified over 50 percent of the animals showing a reaction on the MCT test at a dilution of 1:100 or higher. Ten States have reported reclassifying between 10 and 50 percent of the animals showing a reaction in this range while only 17 States have reported reclassifying less than 10 percent of those detected.

The potential of the market cattle testing program has not been approached. It is anticipated that this program can be expanded from approximately one million blood samples collected at slaughter in 1964 to over five million in the next few years. Screening at this level will provide an excellent surveillance of beef herds in range and semirange areas that cannot be conveniently blood tested on the premises to assure eradication of brucellosis.

#### Swine Brucellosis

The swine brucellosis eradication program has expanded rapidly during 1964. As of December 1, 1964, 1940 herds in 40 States and Puerto Rico have been validated. This is an increase of 726 herds since the end of the last calendar year. The most notable achievements in this phase of the total program occurred when Vermont and Utah became the first and second States respectively, to attain validated Brucellosis-Free Area status.

Three other States have validated one or more counties; California showed the most progress since last year, with an increase of 15 counties in this status. The emphasis on a swine brucellosis eradication program should be closely allied to the bovine brucellosis eradication effort. At this point in the total eradication program the greatest accomplishments toward the reduction of swine brucellosis can be made by concentrating on educating the purebred swine growers as to the benefits of obtaining a validated herd. The funds available for this phase of the program will be more effectively utilized if the validation of herds rather than counties is stressed, since the majority of the replacement animals will originate from free herds.

The brucellosis card test has played a vital role in the swine validation program. Many producers reluctant to subject their herds to a blood test when the anterior vena cava bleeding technique is used have been enthusiastic about the use of the card test. The rapidity with which the test results are known under field conditions on a herd basis has been a distinct advantage in most areas.

The swine industry must be made aware of the dangers of swine brucellosis as a primary cause of undulant fever in the United States. As in calendar year 1963, a significant number of the diagnostic cases of human brucellosis could be traced to contact with infected swine.

#### Vaccination

Many areas of the United States have reduced the incidence of brucellosis to the point where they are now either free or nearly free of this disease. The majority of these areas have developed procedures to maintain effective surveillance of the cattle population. In addition, most of these areas have instituted and developed the problem herd program which effectively supplements the standard surveillance procedures by promptly investigating all cases which could be indicative of brucella infection. Continued emphasis on calf vaccination in such areas can be a liability rather than an asset because of the extreme difficulty in distinguishing between vaccination reactions and active brucella infection. One of the significant findings of the problem herd studies was the inability to eliminate the disease from many of the infected herds because infected vaccinated animals were not removed due to the incorrect interpretation of the reaction as a residual vaccination titer. In areas with an extremely low incidence of brucellosis, the exposure potential for nonvaccinated animals can be minimized with the effective surveillance programs, thus eliminating the necessity for artificial protection through vaccination.

## COOPERATIVE BRUCELLOSIS ERADICATION PROGRAM DATA

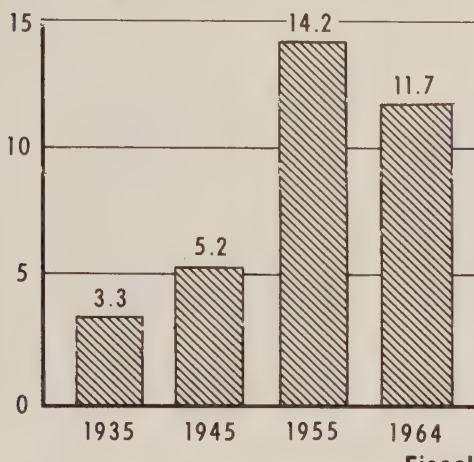
		Calendar Year	Percent Change for 1964
	1963	1964	
Blood Tests			
*Herds-Lots	1,934,146	1,846,960	-4.5
*Reactor Herds-Lots	66,156	60,799	-8.1
Percent	3.4	3.3	(-0.1)
Cattle Tested	11,412,699	11,663,900	+2.2
Reactor Cattle	132,184	135,429	+2.5
Percent	1.16	1.16	(0.00)
Ring Test			
Herd Tests	1,670,292	1,815,644	+8.7
Suspicious Herd Tests	17,201	16,874	-1.9
Percent	1.0	0.9	(-0.1)
Vaccinations	6,962,406	7,154,257	+2.8
Certification of Counties			
Modified Certified	123	76	
New and Reinstated	6	8	
Removed			
Total	2,377	2,341	
Certified Brucellosis-Free			
New	83	104	
Total	233	337	
Total Certified Counties	2,610	2,678	

\*Tennessee MCT lots omitted.

( ) % difference

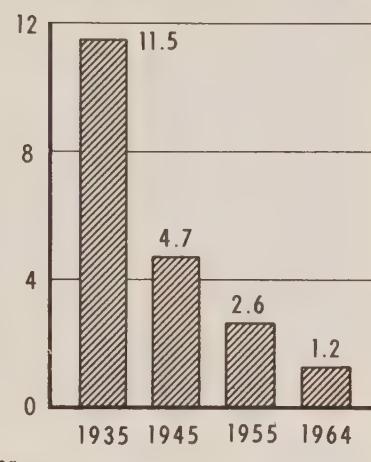
## BLOOD TESTING: CATTLE

## MIL. CATTLE TESTED



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## % REACTORS FOUND

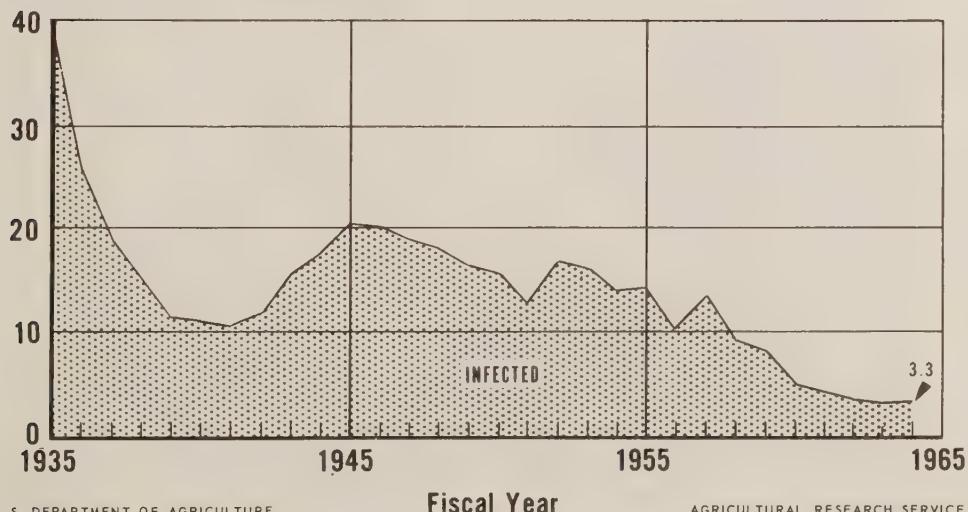


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## BRUCELLOSIS ERADICATION

## BLOOD TESTING: HERDS-LOTS

## % OF BLOOD TESTED HERDS-LOTS



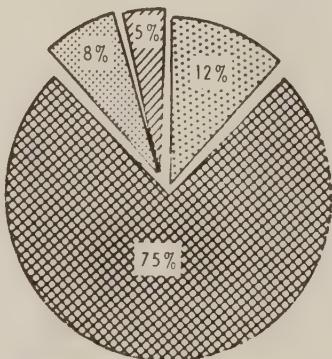
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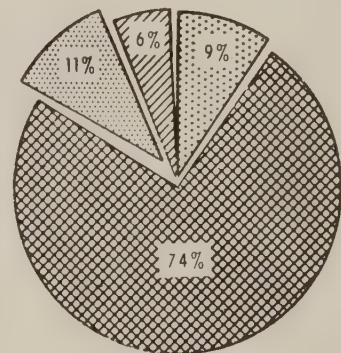
# COUNTY CERTIFICATION STATUS

Cooperative State-Federal Brucellosis Eradication Program

DEC. 31, 1963



DEC. 31, 1964

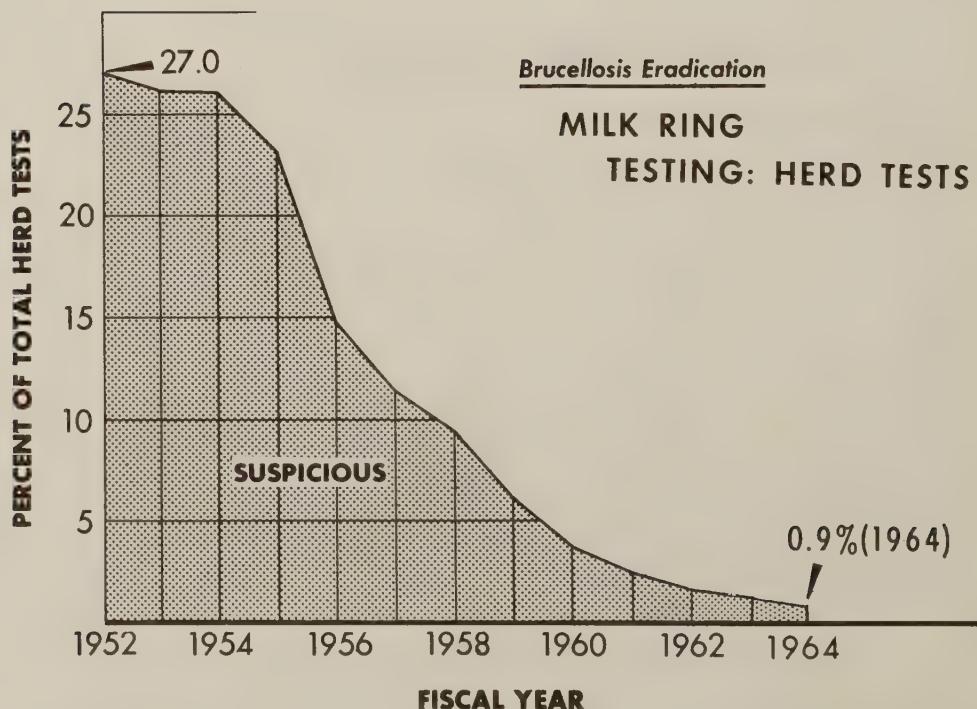


■ Modified Certified  
■ Area Work in Progress

■ Certified Free  
■ Individual Herd Participation

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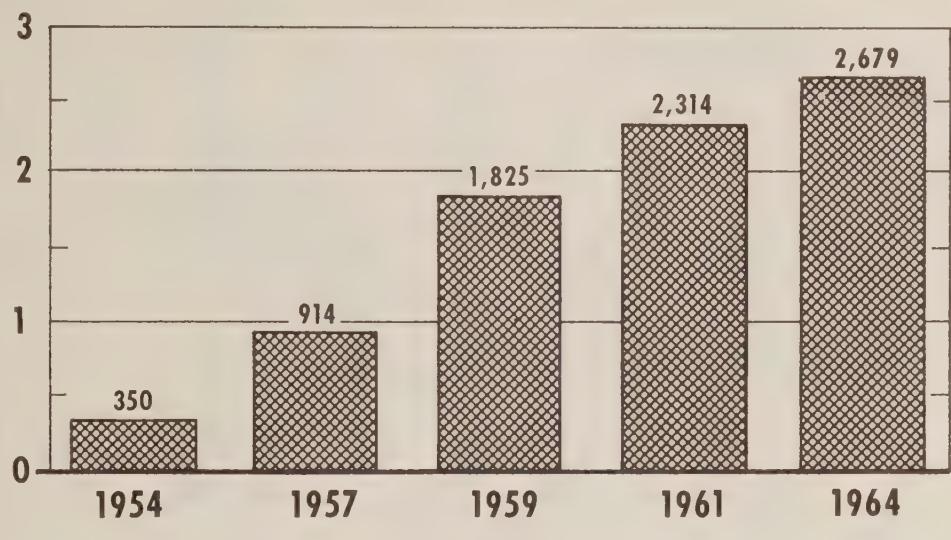
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## CERTIFIED COUNTIES

Cooperative State-Federal Brucellosis Eradication Program

THOUS. COUNTIES



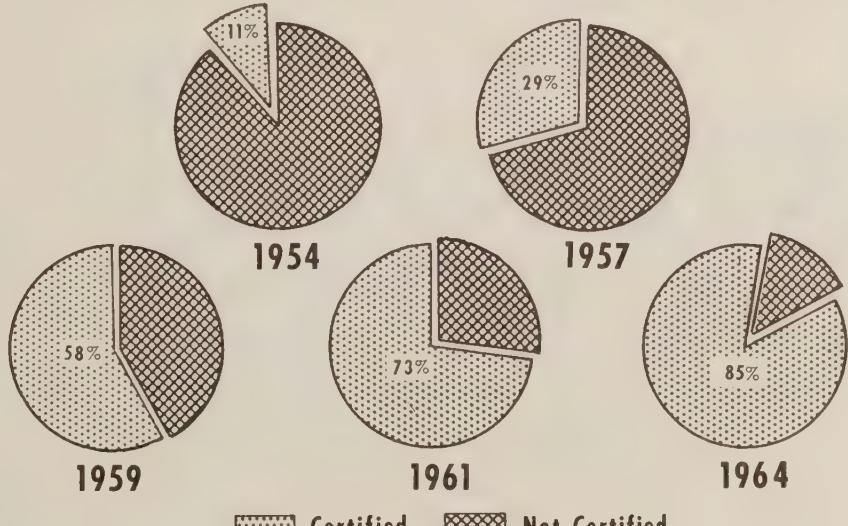
December 31

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## COUNTY CERTIFICATION STATUS

Cooperative State-Federal Brucellosis Eradication Program



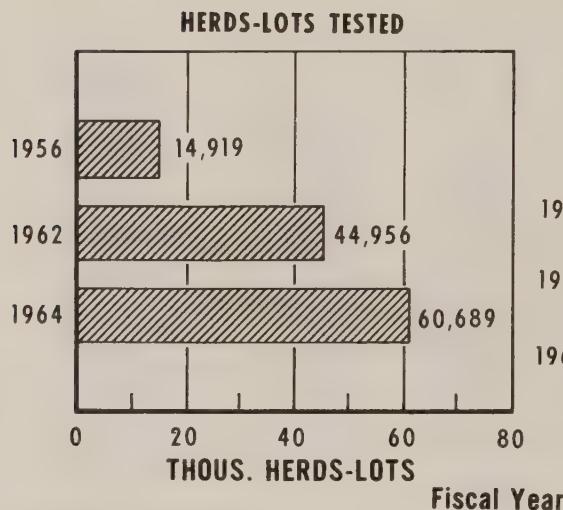
■ Certified   ■ Not Certified

December 31

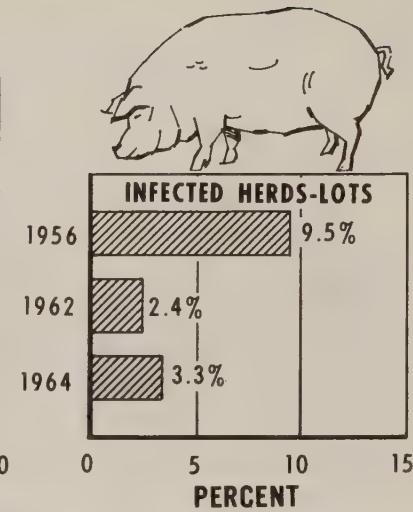
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## BLOOD TESTING: SWINE



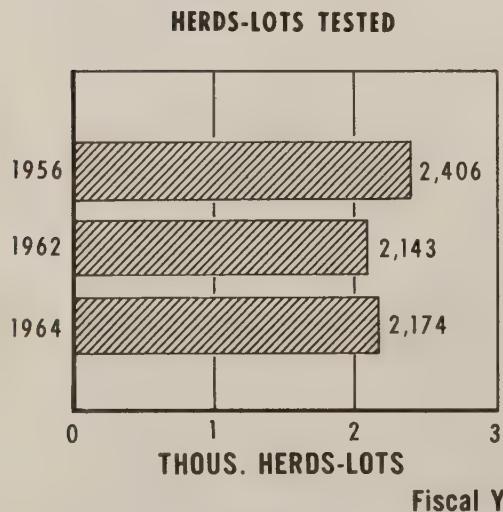
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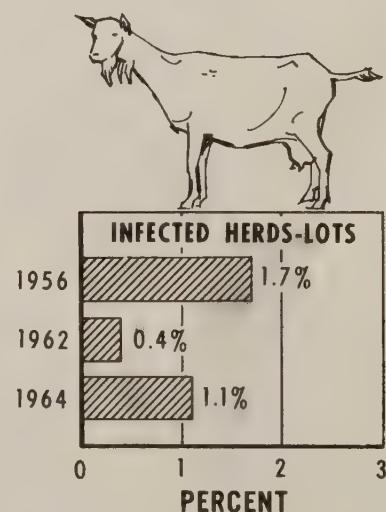
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## BRUCELLOSIS ERADICATION

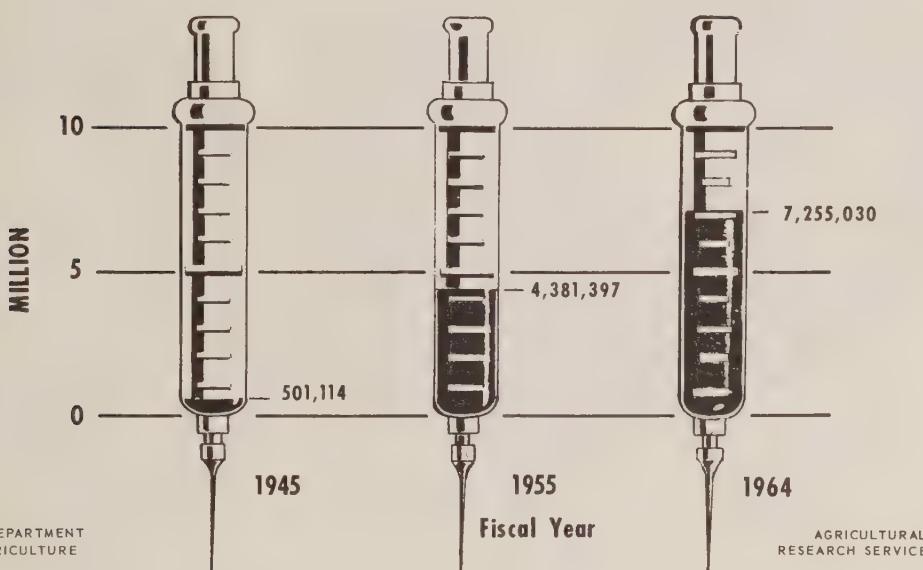
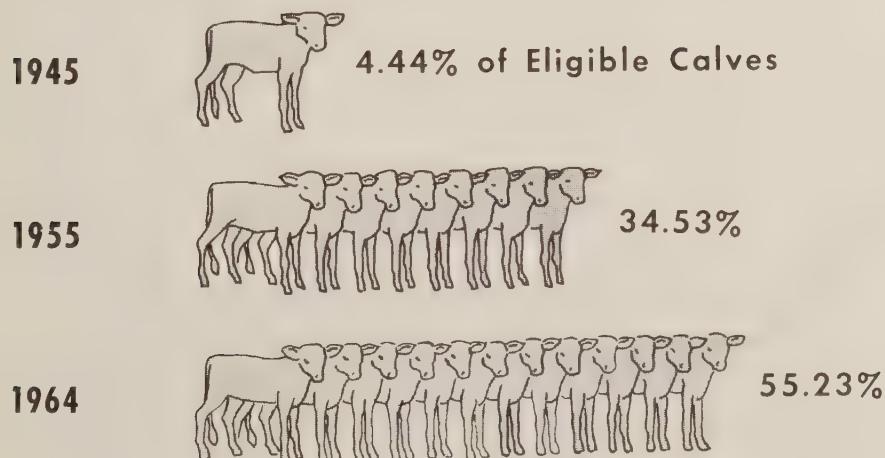
## BLOOD TESTING: GOATS



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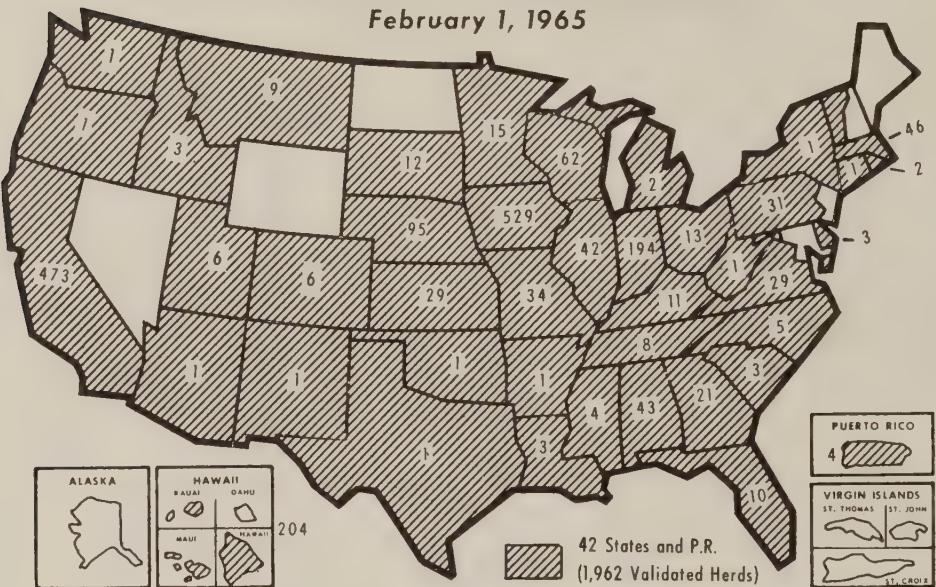


AGRICULTURAL RESEARCH SERVICE

**CALVES VACCINATED****OFFICIAL CALF VACCINATIONS****Fiscal Year**

# STATES WITH VALIDATED BRUCELLOSIS-FREE SWINE HERDS

February 1, 1965



FIVE STATES WITH A TOTAL OF 74 VALIDATED BRUCELLOSIS-FREE COUNTIES,  
CALIFORNIA - 34, GEORGIA - 1, HAWAII - 1, UTAH - 24, VERMONT - 14.

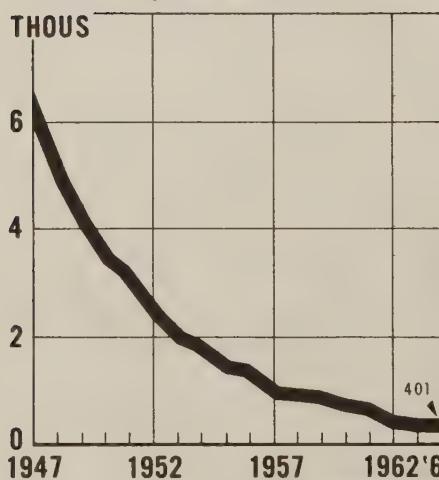
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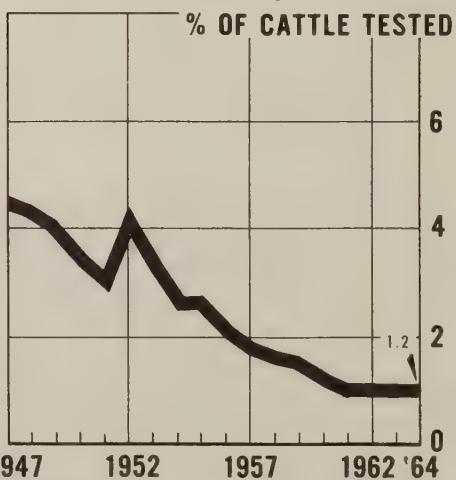
## BRUCELLOSIS ERADICATION

### BRUCELLOSIS-UNDULANT FEVER

#### HUMAN CASES



#### CATTLE INFECTED\*

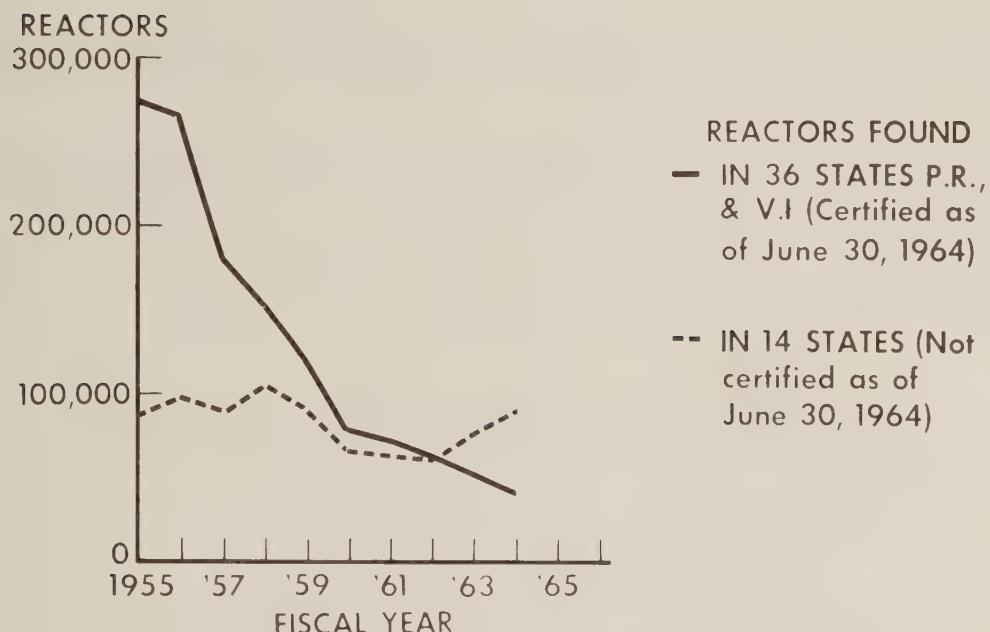


\* Based on blood test only

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## BRUCELLOSIS ERADICATION

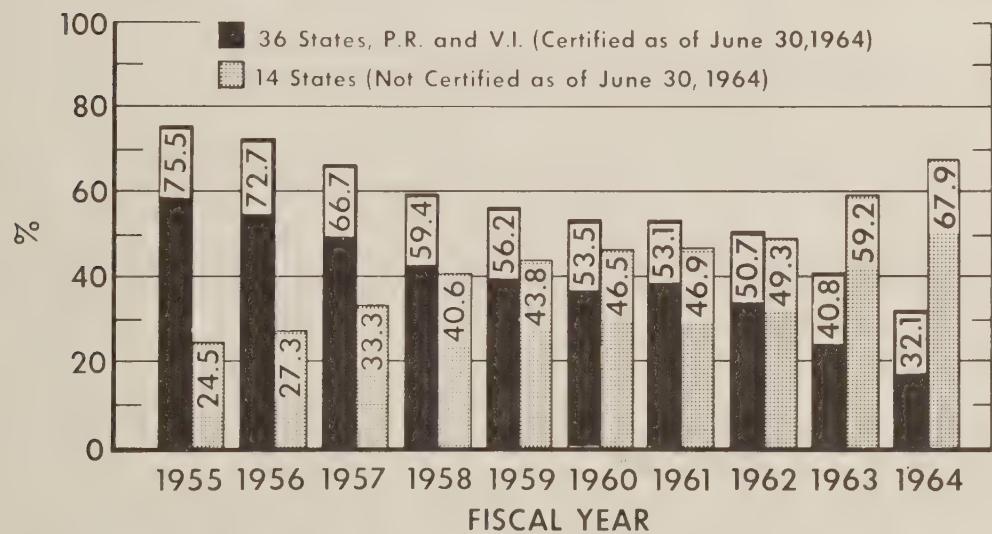


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## BRUCELLOSIS ERADICATION

### REACTORS FOUND EACH YEAR (Percent of U.S. Total)



U.S. DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

RECOMMENDATIONS OF THE NATIONAL BRUCELLOSIS COMMITTEE

by  
S. H. McNutt, Chairman\*

WHEREAS, the resistance provided by Strain 19 Brucella abortus vaccination is as great in calves vaccinated at 4 months of age as in calves vaccinated at 8 months of age or older; and

WHEREAS, the blood serum agglutination titers resulting from vaccination recede more rapidly among calves vaccinated at 4 months of age; and

WHEREAS, the residual titers resulting from vaccination cannot be distinguished from titers resulting from field strains using present diagnostic methods available;

THEREFORE, IT IS RECOMMENDED, that livestock producers who choose to vaccinate their heifer calves, vaccinate these animals as soon as possible after they have reached 4 months of age.

WHEREAS, the brucellosis problem herd program has been successful in eliminating the disease from infected herds without delay; and

WHEREAS, each remaining foci of infection gains increasing importance with each advancement of the brucellosis eradication effort; and

WHEREAS, facilities are available for training specialists to conduct the program;

THEREFORE, IT IS RECOMMENDED, that all Certified States not yet conducting a brucellosis problem herd program take the necessary action to incorporate the use of brucellosis specialists and epidemiologists in the brucellosis eradication program.

WHEREAS, the BRT has proven to be an economical and effective screening device for locating Brucella-infected dairy herds; and

WHEREAS, the efficacy of the BRT is increased by the reduction of the period between tests;

THEREFORE, IT IS RECOMMENDED, that any State which has achieved Modified Certified Brucellosis Status and is not now conducting the BRT on a quarterly basis, adjust its program to conduct the BRT at a frequency of not more than 3 months between tests.

WHEREAS, market cattle testing provides a valuable means of locating infected animals in non-lactating herds; and

\*Dr. McNutt is Professor of Veterinary Science, University of Wisconsin, College of Agriculture, Madison, Wisconsin.

WHEREAS, the market cattle testing program provides continuous surveillance of large numbers of herds at relatively low cost; and

WHEREAS, market cattle testing alleviates the need for on-ranch testing of negative herds;

THEREFORE, IT IS RECOMMENDED, that an increased effort be made to utilize the market cattle testing procedure to screen all eligible animals moving through marketing channels not already screened by the milk ring test.

BE IT FURTHER RECOMMENDED, that USDA review with the officials of the States concerned the USDA costs of vaccination in an effort to divert funds to an expanding Market Cattle Testing program for beef cattle.

IT IS RECOMMENDED, that the cleaning and disinfection of brucella infested premises be the responsibilities of the State and Federal officials of the respective States.

WHEREAS, market swine testing has been demonstrated to be a feasible means of obtaining blood samples and identifying infected herds; and

WHEREAS, market swine testing appears to be the most practical means of establishing Validated Brucellosis-Free Areas;

THEREFORE, IT IS RECOMMENDED, that market swine testing be extended and more fully utilized in areas with a concentrated swine population, and that special attention be given to the testing of garbage fed pigs throughout the country.

WHEREAS, the plate test has been a valuable procedure for the rapid, economical and effective diagnosis of brucellosis in States conducting tests on large numbers of blood samples for brucellosis; and

WHEREAS, it has been established that a tube test can detect infected animals not disclosed by the plate test; and

WHEREAS, the volume of testing is markedly decreased as an area attains Certified Status;

THEREFORE, IT IS RECOMMENDED, that all Certified States not yet using the tube test as the standard test be urged to adopt this procedure immediately.

WHEREAS, the incidence of brucellosis has been reduced to an extremely low level in many areas of the Nation; and

WHEREAS, laws and regulations in some States require calf vaccination as a condition for importation of replacement cattle which results at times in needless restraint on the importation of cattle;

THEREFORE, IT IS RECOMMENDED, that States having these requirements be urged to rescind or amend their laws and regulations.

STATEMENTS PRESENTED TO THE NATIONAL BRUCELLOSIS COMMITTEE

The following statements were presented to the National Brucellosis Committee:

In response to the Chairman's request for suggestions for improving brucellosis eradication procedures, Robert N. Barr, M.D., Secretary and Executive Officer, Minnesota's Department of Health prepared a written statement which was presented to the Committee by Dr. L. P. Williams, Veterinary Epidemiologist, Minnesota's Department of Health. These recommendations were agreed upon by Dr. Barr, Dr. Williams, and Dr. Henry Bauer of the Minnesota Health Department; Dr. J. C. Flint and Dr. G. E. Keller of the Minnesota Livestock Sanitary Board; and Dr. R. K. Anderson of the School of Veterinary Medicine, University of Minnesota.

"I would remind the committee of two facts worth considering. One is that the Scandinavian countries have demonstrated that eradication is possible. The other is that though only 381 human cases of brucellosis were reported in 1963, this is still a problem of public health significance due to its impact on the meat packing and animal handling industry. With this in mind, I support the thesis of eradication.

1. That the eradication program of test and slaughter (combined with good epidemiologic methods) continue in full force in spite of rising costs per reactor found, as the numbers of reactors decreases.
2. That no tolerance of one tube dilution be permitted for vaccinated animals after 1968 in the Brucella Agglutination Testing program. This would seem to be the best deterrent to vaccination of calves beyond the age of 8 months.
3. That a more realistic and uniform indemnity and appraisal program be recommended to all of the states. This could perhaps be best effected by LCI drawing up a model act on this matter similar to the Model Act for Hog Cholera Eradication.
4. That Dr. G. E. Keller's recent letter concerned with the problem of disinfection be considered by the committee. (See enclosure)
5. That the ADE expand their program of the training and utilization of competent veterinary epidemiologists to increase the effectiveness and the efficiency of the eradication movement.
6. That the eradication of swine brucellosis be encouraged through the expansion of the Validated Herd Program. This could be done by encouraging states to adopt a regulation requiring that all breeding stock come from Validated Herds, only.

7. That continued funds be made available for research and demonstration purposes to aid in effectuating the program of eradication, especially in distressed areas."

Also, Dr. G. E. Keller suggested that the present Federal regulations pertaining to the cleaning and disinfecting of brucella infected premises be modified to the effect that no direct supervision be required. However, the owner should certify in writing that he has completed the cleaning and disinfecting requirements.

#### NOMINATING COMMITTEE REPORT

The Nominating Committee of the National Brucellosis Committee composed of W. D. Knox, Chairman; I. H. Borts and S. L. Hendricks presented the following slate of officers:

##### Officers

Chairman: S. H. McNutt  
Vice-Chairman: C. G. Scruggs  
Secretary: R. H. Dastrup  
Assistant Secretary: Mike Bay

##### Board of Directors: 1965-1968

Graham Coulter  
R. Harvey Dastrup  
James Nance  
T. A. Ray  
E. A. Schilf  
W. E. Smith  
D. E. Valine, Sr.  
Archie Wilson

##### Board of Directors: 1965

Jean E. Smith to succeed  
R. W. Smith (Deceased)

##### Executive Committee

Herman Aaberg  
Frank H. Baker  
J. W. Ralph Bishop  
Dudley Campbell  
W. D. Knox  
Bob Laramore  
C. A. Manthei  
C. K. Mingle  
James H. Steele





